

Taylor Wimpey – South Wales

Environmental Permit Application – Supporting Statement

North East Cardiff Phase 2, South Wales

Project No. 315844 SS02 (00)

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RSK GENERAL NOTES

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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1 INTRODUCTION

RSK Environment Limited (RSK) has been commissioned Taylor Wimpey – South Wales, hereafter referred to as Taylor Wimpey, to produce a supporting statement to accompany an application to National Resources Wales (NRW) for a Bespoke Environmental Permit for Phase 2 of their large multi-phased, residential development located to the south of the M4, in Pontprennau, Cardiff, hereafter referred to as "the site"

The report should be read and used in accordance with the limitations and constraints identified in the report text, and at **Appendix A – Service Constraints.**

The Bespoke Environmental Permit is intended to support the discharge of surface water during the construction phase for Phase 2 of the proposed development. Additional and supporting information to that provided in the application forms is included herein.

Sections 1 and 2 also provide a non-technical summary of the planned discharge.

The development is located to the south of the M4, northwest of Pontprennau and east of Lisvane and covers a total area of approximately 135 hectares (Ha). Phase 2 of the development is located in three parcels; 2A to 2C.

Phase 2 of the development is located directly north of St Mellons Road (B4562) and consists of three parcels which are bound to the east by Parkwall Road and Cardiff Gate Business Park beyond. The parcels are bound to the west by agricultural fields and the wider development area to the north (Phase 3), and to the south by Parcel 1A. Phase 2 currently comprises agricultural fields separated by mature hedgerows with wooded areas and existing residence across the centre of the site, separating Parcel 2A and 2B laterally through the middle.

A tributary of the Nant Glandulas is located to the north-east of the site beyond Malthouse Wood and the Nant y Draenog is located to the west of the site.

The approximate centre of the Phase 2 development is at National Grid Reference (NGR) ST 20826 83024.

A site location plan is presented as **Figure 1**.

The following general construction elements are anticipated as part of the development.

- Construction of residential units across parcel 2A and 2B of the development;
- Construction of below ground attenuation crates in parcel 2C;
- Areas of POS in the north of the site including a buffer zone directly north of parcel 2A;
- Formalisation of drainage ditch adjacent to discharge point No.14 in the north of the site connecting to a tributary of the Nant Glandulas;
- Construction of public highways to provide access to new residential areas, including associated infrastructure (foul and surface water (storm) drainage) and attenuation basins and swales.

All public highways will comprise of standard highway specification and construction.

Site surface water run-off will be discharged from the site boundary via a total of 6No. discharge points, as agreed for the final site layout via the planning approval process, with final outfalls from the completed development to both unnamed drainage ditches as well as the Nant y Draenog that

intersect the development. The approximate discharge point locations and discharge rates are set out in **Table 1**.

Table 1: Discharge and monitoring points

Discharge & monitoring Point	Basin Reference	Associated Parcel	Easting/ Northing	Coordinates (NGR)	Discharge Rate (l/s)
OF12	Basin N	2C	320215, 182822	ST 20215 82822	8.75
OF13	Basin L	2A	320347, 182993	ST 20347 82993	48.70
OF13a	Basin Q	2A, 2C	320807, 183113	ST 20807 83113	9.50
OF14	Basin T	2C	320796, 183135	ST 20796 83135	7.70
OF15	Basin S	2A, 2C	320785, 183169	ST 20785 83169	6.30 increased to 18.20 once commercial areas come online in parcel 2C
OF16a	Basin P	2B	320619, 183169	ST 20619 83169	5.12

Depending on site arrangements, flow rates shall be controlled by utilising the physical restricted channel infrastructure, via the permanent outfalls. A plan showing the discharge points is presented as Figure 1 of this report.

This application seeks to secure a Bespoke Environmental Permit for the discharges from the permanent discharge points as outlined above.

2 SURFACE WATER DISCHARGE DESCRIPTION

With respect to the development, surface water refers to the movement of rainwater and associated site generated run-off across the development footprint.

Copies of the engineering drawings for the site as included in the CSWMP presented in **Appendix B** of this document and should be referred to in conjunction with this report. The drawings set out the drainage system for surface waters for the development area.

The surface water drainage strategy for the site indicates the location of permanent attenuation basins, outfalls for said basins and swale features. The arrangements for each parcel of phase 2 of the development are outlined below.

Parcel 2A

Site drainage arrangements are to comprise surface water gullies that drain into a series of swales located along the northern boundary of the parcel. These swales will then drain into attenuation basin Q, located directly to the north of the central section of Parcel 2A, which will discharge into the Nant Glandulas via a new outfall (OF13a). The western section of Parcel 2A will eventually share Basin L with Parcel 1A and discharge from OF13 into the Nant y Draenog to the west.

Parcel 2B

Site drainage arrangements for Parcel 2B are to comprise surface water gullies that drain into a new attenuation basin, Basin P, to the east of the parcel. Basin P will discharge via a new headwall, with outfalls indicated to be to a be OF16a to the northeast of the parcel which eventually feeds into the Nant Glandulas.

Parcel 2C

Site drainage arrangements for the retail parcel, Parcel 2C to the east of Parcel 2A, are to comprise surface water gullies that drain to proposed below ground cellular attenuation storage or basins, subject to final development layout. These will have an outfall with either Basin T or Basin S to the northeast of Parcel 2A and in the case of Basin S, have a shared basin with the residential parcel. Basin T will outfall at OF14 and Basin S will outfall at OF15 along the same man-made watercourse in the area of POS to the northeast, which will eventually form a confluence with the Nant Glandulas.

The western section of Parcel 2C which is separated to the west by the central residential Parcel 2A, will outfall into Basin N, which has a basin headwall with the Nant y Draenog at OF12.

The final discharge point and outfall references for each of the three parcels are provided in Table 1. Exact locations and grid references are to be confirmed.

A site specific CSWMP, presented within **Appendix B**, has been developed for the site, with the surface water mitigation set out within that report. Furthermore, regular inspections and updates of the CSWMP should be undertaken through the lifespan of the development to ensure that the mitigation strategy remains appropriate. A site-specific Construction Environmental Management Plan (CEMP) has also been produced for the site and a copy is included in **Appendix C**.

Surface water discharges from the site will comprise rainfall falling onto the development area, including haul roads, building footings and areas of disturbed/exposed ground following the installation of below ground infrastructure and the formation of ground levels to finished floor levels

(FFL). As a result of general construction activity, silt may become entrained within site surface water drainage. In light of this, mitigation measures have been designed to minimise remobilisation and assist with the removal of silt from site surface water drainage, prior to discharge.

The proposed treatment may comprise both passive and/or active methods to remove silt from water, with a focus on passive mitigation. However, the future requirement for water treatment using chemical flocculants cannot be fully discounted and is subject to future site conditions. Therefore, an Environmental Permit is being applied for that includes provision to use gel and liquid flocculants.

Water discharged from the proposed discharge points will consist of rainwater run-off that has been generated and collected within the development site. It is confirmed that no foul water will be present in the proposed discharge and that this permit application is not associated with the pumping or treatment of foul water.

A site plan showing the indicative discharge arrangements, passive treatment and key monitoring/sampling locations associated with the proposed development is presented on Figures 2 and 3 of the SWMP, presented in **Appendix B**.

3 ENVIRONMENTAL MANAGEMENT SYSTEMS

Taylor Wimpey South Wales have a series of environmental management systems (EMS) in place which set out the requirements for effectively managing work activities to prevent pollution of water, air and land. Taylor Wimpey South Wales seek to minimise the impact of their site operations, particularly in relation to climate change, energy, water, waste and biodiversity through compliance with their EMS. Taylor Wimpey South Wales is audited on a regular basis with relevant employees provided with specific environmental training.

Copies of the relevant environmental management systems utilised by Taylor Wimpey South Wales are presented in **Appendix D**.

4 QUALITY OF DISCHARGE WATER

The site has been subject to intrusive ground investigation works, conducted by Terrafirma in 2019 with subsequent interpretation by WSP.

The reports describe a site wide investigation of soil and controlled water conditions.

The ground investigation report included a contamination risk assessment supported by laboratory analysis of several samples collected from the soil and groundwater. The assessment indicated that there were no exceedances of residential General Acceptance Criteria (GACs) detected in soil samples taken during the investigation.

Soil leachate, groundwater and surface water analysis identified metal concentrations elevated above their relevant water quality standards (WQS) however, these elevated concentrations were considered to represent background concentrations. Therefore, WSP concluded that risks to groundwater and surface water were considered to be low.

To further assess this risk and to confirm the likely absence of specific substances within any potential discharge from the site, RSK attended site on 08 April 2026 to obtain additional surface water samples.

Advice received previously from Senior Permitting Officers is that *'in cases where it is not possible to test the final effluent, groundwater samples or water samples from on-site excavations / attenuation basins (or similar) would likely represent a suitable alternative'*. The site was pre-construction stage and as such, there was no 'effluent' (rainfall dependent surface water run off generated during the construction process) to sample and test. Therefore, two samples from the receiving surface water course (Nant Glandulas upstream and downstream of the proposed final outfall east of parcel 2B) were also scheduled for an appropriate suite of analysis.

The results of the analysis were assessed against environmental quality standard (EQS) presented in "The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Prior to the screening assessment, the bioavailability of certain metals (copper, zinc, manganese, and nickel) was determined using the metal bioavailability assessment tool (M-BAT).

The key output of the M-BAT tool is to estimate the bioavailable concentration of a metal under the surface water conditions found at a site, which can then be compared with the $EQS_{bioavailable}$ to assess compliance. Chemical values for DOC, pH and calcium are required in the receiving watercourse to calculate the site-specific bioavailability of metals. The M-BAT tool was used to derive site-specific Predicted No-Effect Concentration (PNEC) values which replace the EQS for screening purposes.

The results of this assessment found that there were no exceedances of EQS / PNEC values for any potential contaminants of concern, with the exception of a marginal exceedance of copper from the proposed outfall point and upstream. Given the conclusions of the previous WSP interpretive report, risks to controlled waters are considered to be low and there will be no specific substances in any discharge from the site during the construction phase. The results of the surface water analysis along with the M-BAT calculation sheet is presented in **Appendix E**.

Consequently, the principal contaminant to surface waters is considered to be from mobilised silt (suspended solids), during surface water runoff, associated with exposed soils during the enabling and construction phases of the development. The risk from which is further assessed in **Section 5**.

It should be noted that the following two factors could influence the potential concentration of suspended solids within run-off prior to treatment. These include:

- Amount of exposed sediment available for mobilisation; and
- The volume of rainfall which generates site surface water drainage.

5 RISK SCREENING ASSESSMENT

An assessment of the environmental risks of the operations covered under this application for a discharge consent has been prepared in accordance with the following principles of the H1 methodology and the superseding NRW Horizontal guidance which mirrors the EA surface water pollution risk assessment guidance (https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit#when-you-do-not-need-to-carry-out-screening-tests):

- Step 1 – identify risks
- Step 2 – assess risks
- Step 3 – justify appropriate measures (if needed)
- Step 4 – present the assessment.

Groundwork and construction for the development within the application area has commenced. Large scale topsoil and vegetation clearance has been undertaken, attenuation basins and cut off trenches have been installed, and highway construction has partially commenced.

Step 1: Identify Risks

The H1 overview document identifies the following different types of risk to the environment.

- Odour – there are no potentially odorous activities or chemicals associated with the construction work.
- Noise & vibration – construction noise & vibration will occur but be limited to the allowed working hours (0800-1800 Monday to Friday and 0800 to 1300 Saturday). Noise & vibration resulting from the discharge activity are not envisaged as being significantly more noticeable than from the other construction activities at the site.
- Accidents – the potential for accidents to occur exists. The potential for contamination of the receiving surface waters will be managed to acceptable levels by the control measures put in place for the construction activities.
- Fugitive emissions to air and water - no significant risks have been identified for emissions to air. The potential for contamination of the surface water receptors will be managed to acceptable levels by the control measures put in place for the construction activities.
- Controlled releases to air – there are no point source emissions to air.
- Controlled discharges to surface water – surface water discharge locations have been identified as outlined within Section 1 and shown in Figure 2 of the CSWMP presented in **Appendix B.**
- Controlled discharges to ground or groundwater – there are no discharges to groundwater.
- Global warming potential of air emissions – negligible as surface water discharge.
- Site waste – the quantity of site waste generated will be small and consist primarily of silt/sediment removed from the surface water management system. This would be re-used at site (where feasible) under the appropriate regulatory approvals or disposed of at an appropriate facility.

Steps 2/3/4 – Assess Risks

In accordance with the H1 methodology and the NRW surface water pollution risk assessment guidance, the following activities have been considered relevant to the proposed permit application and therefore carried forward in this risk screening assessment:

- Accidents.
- Surface water discharges.

Due to the proximity of nearby surface waters, existing highways and associated drainage infrastructure and the poor infiltration recorded on the site, it is not considered necessary to consider risks to groundwater. As described in Section 2 of the accompanying CSWMP, presented in **Appendix B**, the superficial and bedrock geology beneath the site largely comprise clay derived from weathered in-situ mudstones and sandstones.

The underlying bedrock at the site is classed as Secondary A aquifer and the site does not lie within a Source Protection Zone (SPZ). The risk the site is considered to pose to sensitive controlled waters receptors is low.

5.1 Accidents

The site will be secured by fencing with no public access. Therefore, accidental releases as a result of vandalism are not likely. However, the potential for accidents/accidental releases of contaminants, such as fuel, on the construction site cannot be discounted and as such is assessed.

A risk assessment for accidents is presented in **Table 2**.

5.2 Surface Water Discharges

Prior to the commencement of construction activities at the site, rainwater falling across the development site would discharge by one of the following pathways:

- Infiltrate into the topsoil and percolate into the underlying geology;
- Flow via overland flow, downgradient to the drainage ditches present on site

Accordingly, the surface watercourses which the proposed discharges will enter are the same as those which received run-off prior to the commencement of construction activities.

The water to be discharged from the site comprises site surface water drainage from the development area.

As identified previously, the principal potential contaminant to surface waters is mobilised silt (suspended solids).

No other significant pollutants or priority hazardous substances associated with the proposed site discharge have been identified.

As detailed in the CSWMP, the potential risks associated with the proposed discharge will be reduced by the implementation of management and mitigation measures.

The management and mitigation measures installed at the site will remove suspended solids from site surface water drainage and ensure that discharges from the site will be clean and uncontaminated. Regular monitoring will be supported by sample collection and analysis, to confirm appropriate discharge quality is maintained.

The discharge will be at ambient conditions so there will be no temperature effects as a result of the management and mitigation measures.

As the discharge will not contain any hazardous substances, sanitary determinants or other pollutants, detailed specific substances assessments are not considered to be necessary.

The proposed site surface water discharge risk assessment (including accidents) is presented in **Table 2**.

Table 1: Risk Assessment for Proposed Site Surface Water Drainage Discharge

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Leak/spillage of hazardous material on site (e.g. oils and fuels)	Nant y Draenog and Nant Glandulas	Via overland flow or via the surface water drainage system (storm system)	Containment measures for storage. All fuel stored on impermeable ground in appropriate containers such as bunded cells with double walls. Additional capacity, drip trays/sump pallet will also be deployed, if required. Spill kits will be maintained adjacent to storage areas. Minimisation of storage volumes. Regular maintenance & inspection	Unlikely	Contamination of Nant y Draenog and Nant Glandulas with hazardous substances.	Low – due to procedures detailed in site environment management plans (e.g. fuel/oil use and storage, waste/material storage).

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Leak of oil/fuel from pumps used as part of a water treatment system or other temporary pumping activity	Nant y Draenog and Nant Glandulas	Via overland flow or via the surface water drainage system (storm system)	Containment measures for storage. All fuel stored on impermeable ground in appropriate containers such as bunded cells with double walls. Additional capacity, drip trays/sump pallet will also be deployed, if required. Spill kits will be maintained adjacent to storage areas. Minimisation of storage volumes. Regular maintenance & inspection	Unlikely	Contamination of Nant y Draenog and Nant Glandulas with hazardous substances.	Low – due to procedures detailed in site environment management plans (e.g. fuel/oil use and storage, waste/material storage).

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Discharge of water containing suspended solids (silt)	Nant y Draenog and Nant Glandulas	Overland flow from site, or discharged from outfall(s)	Silt mitigation measures set out within site-specific SWMP including silt fences, silt curtains and basin headwall protection. Regular monitoring and update to mitigation and management measures as required. Testing of discharge.	Low	Contamination of Nant y Draenog and Nant Glandulas with suspended solids (silt).	Low – with management and monitoring measures in the SWMP to reduce the potential for additional silt to be present in the site surface water drainage. Suspended solids to be removed from site surface water drainage via passive management systems prior to discharge. If the water shows signs of silt, the discharge will be suspended and the management systems inspected for signs of a fault. Any faults with the passive management measures will be immediately rectified, with discharges recommencing under close observation to confirm fault resolution. Faults with flocculant based management measures will be addressed in consultation with the supplier. Once resolved, discharges will recommence under close observation.

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Discharge of water containing Polyacrylamide from flocculant dosed passive treatment process Gel Flocculant 360 and 494	Nant y Draenog and Nant Glandulas	Discharged from outfall(s)	Completion of a thorough chemical dosing trial by the supplier of the treatment system to determine the appropriate chemical dosing rates prior to the commencement active treatment activities. Regular monitoring and testing of discharge to confirm adequate discharge quality. There are no known components present within either Gel Flocculant 394 or 494 that are classified as hazardous to health or the environment.	Low	Contamination of Nant y Draenog and Nant Glandulas with dosing chemicals.	Low – The completion of a dosing trial by the supplier of the passive management system has been undertaken and calculation will be undertaken prior to usage in each specific location, dependent on flow rates and volume will ensure that the volumes of the chemicals are applied to the incoming water and that there are no residual chemicals in the treated water upon discharge. If monitoring and testing identify the potential imbalance in chemical dosing rates, the management system supplier will be contacted and a revised dosing trial will be undertaken and chemical dosing rates will be updated as necessary.

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Spillage of collected solids from sediment collection systems	Nant y Draenog and Nant Glandulas	Overland flow, or discharged from outfall(s)	Preparation and review of activity specific method statements for cleaning sediment collection systems. Method statements to consider risks associated with spillages of collected solids. Discharges from outfalls prevented during sediment collection. Site spillage control procedures. Deployment of additional silt management / spill kits.	Unlikely	Contamination of Nant y Draenog and Nant Glandulas with suspended solids (silt).	Low – settlement system to be cleaned in such a way as to prevent silt spillage. Discharge outfalls to be bunged during cleaning. Cleaning to be completed by competent persons. Risk assessment and method statement to be carried out prior to cleaning.

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Failure of pumping equipment – overflow of water from drainage etc.	Nant y Draenog and Nant Glandulas	Via surface flow or surface water drainage system	Management measures set out within site-specific SWMP	Unlikely	Contamination of Nant y Draenog and Nant Glandulas with suspended solids (silt).	Low – water is contained on site within surface water detention basins if pumps fail.
Vandalism – unplanned release of fuel, or other hazardous substance.	Nant y Draenog and Nant Glandulas	Via surface flow or surface water drainage system	Site is secure without public access. Sensitive materials stored securely in lockable containers.	Unlikely	Contamination of Nant y Draenog and Nant Glandulas	Low - due to security arrangements.

6 DISCHARGE VOLUMES

The maximum cumulative discharge rate from all outfalls, as summarised in **Table 1,** is 97.97 l/s, which corresponds to the maximum flow rate associated with the flow control chambers designed to calculated QBAR values for their respective upgradient drainage catchments.

A breakdown of the associated daily volumes derived using QBAR values is provided in **Table 3.**

Table 3: Summary of Maximum Daily Discharge Rates

Maximum Instantaneous Discharge Rate	Maximum Discharge Rate (per minute)	Maximum Hourly Discharge Rate
97.97 l/s	5,878.2 l/min	352,692 l/hr
0.09797 m^3/sec	5.8782 m^3/min	352.692 m^3/hr

Site surface water run-off will be discharged from the site boundary via a total of 6No. discharge points, as agreed for the final site layout via the planning approval process, with final outfalls from the completed development to both unnamed drainage ditches as well as the Nant y Draenog that intersect the development. These discharge to the Nant Glandulas.

Depending on site arrangements, flow rates shall be controlled by utilising the physical restricted channel infrastructure, via the permanent outfall.

Based on the above, this equates to a maximum discharge rate of **8,464 m^3/day** (rainfall dependant).

7 TREATMENT

It is proposed that an option be available for the application of gel flocculants and liquid flocculants to be utilised in addition to passive, gravity-driven silt settlement methods, to ensure that clean, silt free water is discharged from the site.

As outlined in the attached CSWMP, which is contained within **Appendix B**, the proposed surface water and silt management strategy will utilise passive / gravity driven systems installed across the development site.

The proposed passive / gravity driven systems include the deployment of silt mats, silt fencing, cut off trenches, basin compartmentalisation and retaining topsoil and vegetation in areas not immediately required for development. It is considered that through the operational practices contained in the CSWMP, these systems will remain in place throughout the site's lifecycle.

Whilst the type of protection measures and position depicted in the enclosed site plan provide a representative arrangement layout, it is considered prudent to mark these as indicative locations due to their potential to be relocated during the construction lifecycle.

Due to site constraints, the proximity of the receiving waters and settlement rates identified during flocculant dosing tests, it is considered appropriate to supplement the deployment of the abovementioned management systems with measures utilising gel and liquid flocculants. These measures include the use of flocculant gel blocks and flocculant laced silt mats, or as a worst case scenario, an active water treatment system such as a Siltbuster. Settlement tests have been undertaken for both gel and liquid flocculant and the results are provided in **Appendix E.** Prior to installing gel flocculant blocks or using flocculant laced silt mats, treatment system environmental calculations will be undertaken for the proposed deployment locations, dependant on build phasing and risk, which will calculate the degradation of the gel blocks based on the number of flocculant blocks required and the expected flow rate in the proposed location, to ensure that flocculant is not over or under dosed.

Depending on site conditions and requirements, flocculants may be deployed in pump assisted (active) systems via means of an inline pipe reactor, containing gel flocculant blocks, to circulate surface water on site. Alternatively, active water treatment using a Siltbuster type system would be used.

Copies of the appropriate material safety data sheets (MSDS) for the gel and liquid flocculants proposed, along with copies of the site specific dosing trials are presented within **Appendix F**.

It is anticipated that these treatment measures are utilised during periods of heavier rainfall; such as the winter months, to provide additional treatment, increasing settlement rates, reducing the natural attenuation time and immediate discharge capacity across the development site.

It is considered important to highlight that, owing to the nature of activities undertaken at the site and likely alterations in build phasing during the lifecycle of the construction site, it is not possible to define set treatment locations. These will need to be located to maximise the efficiency of the system, to ensure that surface water is appropriately managed and to facilitate the continuation of wider site activities.

Discharge of surface water will not contain gel or liquid flocculant product. The design of gel flocculant use will incorporate sufficient settlement area, which will be calculated based on the anticipated location specific flow rates, to ensure that it drops out of suspension prior to outfall

within the on-site temporary and permanent basins. Active water treatment typically utilises lamella settlement tanks.

When operational, the treatment locations would be visually inspected on a daily basis. Should any evidence of faults or pollution incidents be identified, the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

Regular sampling and monitoring will be undertaken at the designated discharge points to ensure the treatment is successful and that suspended solids have been removed such that the water is below the compliance limit of 60 mg/l.

Water samples may be collected at the point of discharge and submitted to an external testing laboratory for analysis of the following determinands:

- Total suspended solids (TSS); and,
- pH.Total Aluminium (mg/l)
- Dissolved Aluminium (mg/l)

It may be necessary to monitor water quality with respect to TSS whilst on site and at short notice for decision making on treatment and discharge options. One option would be the use of a portable turbidity meter. Turbidity is measured in nephelometric turbidity units (NTU); which relates to the transparency or clarity of the water. This test can be conducted in a few minutes in the field using appropriate equipment.

There is no standard correlation between TSS and NTU. Therefore, if on-site NTU measures are required, a relationship between TSS and NTU will be established. It is considered that this would be achieved through the preparation of a suitable calibration curve which would enable the conversion of NTU readings to a representative TSS value. This would strengthen confidence in using an NTU value on site during short term decision making. It is important to note that it is not an absolute value however, it is considered to be a robust method for assessing water quality whilst on site in the very short term.

Turbidity measurements would be collected at appropriate intervals at the designated discharge points.

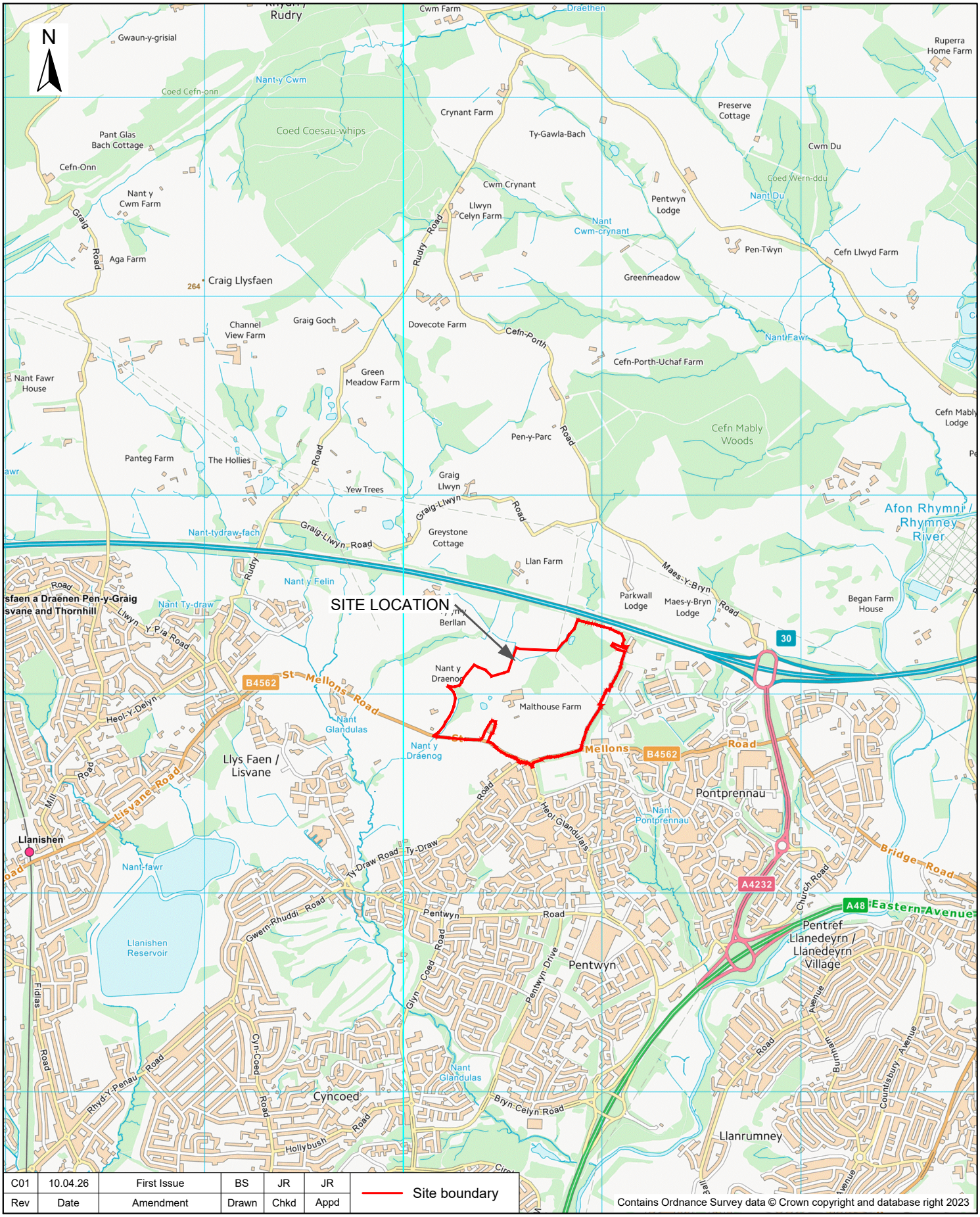
The use of a NTU calibration curve and NTU testing as an on-site screening criterion would ensure that treated discharge is stopped immediately, if the NTU suggests that the TSS would be exceeded and allows for further corrective actions to be put in place.

Maintenance of the surface water mitigation measures, in the form of the settlement tanks, surface water basins and their de-silting would be needed throughout the operational lifespan of the equipment.

The maintenance of passive silt management measures is to be maintained by the site operator, with appropriate assistance from the equipment supplier.

In order to ensure compliance, regular sampling and monitoring of the discharge point and associated watercourse will be undertaken throughout the construction phase.

FIGURES



Rev	Date	Amendment	Drawn	Chkd	Appd
C01	10.04.26	First Issue	BS	JR	JR

RSK GEOSCIENCES
The Old School
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Web: RSKGeosciences.co.uk

Client: Taylor Wimpey South Wales

Project Name: North East Cardiff - Phase 2

Description: Site Location Plan

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	320710,182973	315844	11102	C01	315844-BL-111-XX-D-G-11102-C01

APPENDIX A – SERVICE CONSTRAINTS

APPENDIX A
SERVICE CONSTRAINTS

1. Service Constraints

1.1. This Report (the “Report”) and any study, inspection, investigation, sampling, testing and or interpretation carried out in connection with the Report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) trading as RSK Geosciences, for the Client named in the first paragraph of the Report (the "Client") in accordance with the terms of an RSK Fee Proposal including RSK Environment Standard Terms and Conditions (the “Appointment”) between RSK and the Client, unless otherwise stated in the first paragraph of the Report. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by a geo-environmental consultant at the time the Services were performed. Nothing in this Report shall be construed as imposing any fitness for purpose obligation. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the Client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.

1.2 Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services. RSK shall not be liable in respect of any action or proceedings arising out of or in connection with this Report whether in contract, in tort, for breach of statutory duty or otherwise after the expiry of six (6) years from either (i) the date of the Report or (ii) such earlier date as prescribed by law, unless varied in the terms of the Appointment.

1.3 Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent, or condone any party, other than the Client relying upon the Services. Should this Report or any part of this Report, or details of the Services or any part of the Services, be made known to any such party, and such party relies thereon, that party does so wholly at its own and sole risk, and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent geo-environmental consultant and/or lawyer.

1.4 The Client shall not, without the prior written consent of RSK, assign, transfer, charge, mortgage, subcontract, or deal in any other manner with all or any of the benefits provided in this Report. Unless specified in the Appointment, RSK shall not be obliged to assign the benefit of the Report whether by collateral warranty, third party rights pursuant to the Contracts (Rights of Third Parties) Act 1999, letter of reliance or otherwise. If RSK agrees to any assignment of the benefit of this Report, in whatever form, benefits to third parties through collateral warranties, third party rights or letters of reliance shall not be provided unless a fee for each right, warranty or letter is agreed. The form of wording used in the warranty or letter shall be provided by RSK for agreement by the Client. Any reasonable changes to the form of wording will be implemented by mutual agreement, however the terms in the warranty or letter cannot offer the third party any greater benefit than the Appointment offered to the Client.

1.5 It is the understanding of RSK that this Report is to be used for the purpose described in the introduction to the Report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the Report is used, or the proposed use of the site change, this Report may no longer be valid and any further use of or reliance upon the Report in those circumstances by the Client without the review and advice of RSK shall be at the Client's sole and own risk. RSK shall not be liable for any use of this Report for any purpose other than that for which it was provided.

1.6 The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions contained in this Report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the Report in the future shall be at the Client's own and sole risk.

1.7 The observations and conclusions described in this Report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out, or required by the Appointment between the Client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this Report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, fuel storage, persistent bio-accumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.

1.8 The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of desk based publicly available information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services and the limitations below:

a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the Client or third parties, including laboratories and information services, during the performance of the Services.

d. The Client has identified in writing to RSK, the information, reports, findings, surveys and preliminary works RSK may not rely upon when providing the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK, and including the doing of any independent investigation of the information provided to RSK, save as otherwise provided in the terms of the Appointment between the Client and RSK.

1.9 Any site drawing(s) provided in this Report is (are) not meant to be an accurate base plan for scale measurement but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for accurate setting out and should be considered indicative only.

1.10 Should RSK be requested to review the Report after the date of issue of this Report, RSK shall be entitled to additional payment at the existing rates, or such other terms as agreed between RSK and the Client.

2. Service Constraints where the Report provides an intrusive assessment of ground conditions:

2.1 The intrusive environmental ground investigation aspects of the Services are a limited sampling of soil from the site, at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this Report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent

of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope agreed between the Client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species (not tested) are not present.

2.2 The comments given in this Report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development, site usage, timescales or the Client's specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an indicative assessment of ground conditions on site. There may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

2.3 Where the Services include Investigation of an exploratory nature or relating to physical ground works, any costings and prices provided in the Report are estimated and provided for guidance purposes only. The actual cost and time quantities shall be remeasured and shall be dependent upon the ground or other conditions, constraints present, and number and depth of the investigation locations, which shall influence the number of samples and tests required, and the quantities of soil being classified.

2.4 Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works. However, this Report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

2.5 Unless stated otherwise, only preliminary geotechnical recommendations are presented in this Report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed. Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this Report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7, although this is subject to the restrictions imposed on the investigation, as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this Report will not meet the requirements of a Geotechnical Design Report (GDR) and should therefore be used for preliminary guidance only.

3. Service Constraints where the Report relates to Surface Water Management:

3.1 The Surface Water Management Inspection (SWMI) Report, documents provided, observations, actions, and recommendations, with respect to the management of potential pollution issues to surface waters, made during the site Inspection visit, are those present at the time of the visit, and may not represent those recorded by others on the same day.

3.2 The comments given in this Report and the opinions expressed are based on the weather, ground and ground water conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the inspection and therefore could not be taken into account. In addition, groundwater levels and flows, may vary from those Reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

3.3 RSK places a degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this Report was prepared.

3.4 This Report is a live document, to be continually reviewed and updated as the development progresses or other changes occur on site. RSK can only maintain the currency of this Report through the Client requesting support with supplementary site visits or attendance at meetings ahead of key stages of the development in relation to surface water management. Our risk rating assesses a number of risk factors in line with the source-pathway- receptor model and is therefore subject to constant change.

3.5 Standard design drawings are indicative. Material types, dimensions and construction details will need to be adjusted by the Client to suit the specific conditions / flows on Site.

3.6 The full responsibly for implementing the site-specific protection and maintenance measures to protect the surface water system as stated in this Report, remains with the Client and their site management team. Additional control measures may be required to achieve the objectives set out in the Surface Water Management Plan to be implemented and financed by the Client.

4. Service Constraints where the Report relates to Waste Management:

4.1 In accordance with the definition provided in the Waste Framework Directive (WFD), materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded, by the holder'. Naturally occurring soils are not considered waste if re-used on the site of origin for the purposes of development. Soils such as made ground that are not of clean and natural origin (irrespective of whether they are contaminated or not) and other materials such as recycled aggregate, do not necessarily become waste until the criteria above are met. Excavation arisings from the development may therefore be classified as waste if surplus to requirements and/or unsuitable for re-use.

4.2 It is the duty of the waste producer, to ensure that all waste is accurately classified prior to waste disposal. Technical Guidance WM3 (EA, 2018) sets out in its Appendix D requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity. Unless otherwise stated, the waste assessment presented in this Report should be considered as preliminary and further testing and assessment of the waste under the provisions of a Waste Sampling Plan may be required to obtain the necessary level of data required for basic characterisation of the waste in support of disposal.

4.3 Unless stated otherwise in the Report, information relating to historical operations at the site was not reviewed as part of the assessment by RSK. In addition, unless otherwise stated in the Services, RSK was not present during the collection of the samples nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this Report are based solely on any information that were provided to RSK (e.g., laboratory chemical data, exploratory hole records) and were completed without prejudice for our Client.

4.4 RSK's assumes that any ground investigation data, chemical testing results etc., that were provided by the Client to inform the waste assessment and supporting review were carried out in accordance with current best practice and relevant guidance/ standards, where applicable. Thus, the

comments given in this Report and the opinions expressed are based solely on the information provided by the Client. However, it is noted that there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account as part of the RSK assessment.

5. Service Constraints for Construction Environmental Management Plan Reports:

5.1 This Report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

5.2 The measures and comments outlined in this Report and any opinions expressed are based on the plans provided at the time and discussions with relevant parties. However, there may be conditions pertaining to the site that have not been disclosed by investigations and therefore could not be taken into account.

5.3 This CEMP is a live document and is subject to change throughout the project, as and when necessary, to ensure management of environmental aspects remains relevant, and to ensure continued compliance with legislation and commitments as they may change. RSK understands that this CEMP will be reviewed by the Client every six months and updated as and when necessary.

5.4 It is the full responsibility of the Principal Contractor/ Client to ensure that their works do not contravene legal requirements, and adherence to this CEMP alone cannot be a full defence regarding legal action against the Principal Contractor.

6. Service Constraints where the Report relates to Ground Gas Membrane Verification:

6.1 This Report is limited to the verification of the gas resistant membrane/vapour membrane/ radon barrier after installation and no inspections were undertaken of the substrate (i.e. prepared ground). The Report therefore does not constitute as a full verification of ground gas protection system.

6.2 The comments given in this Report and the opinions expressed, are based on the condition of the ground gas membrane as encountered at the time of inspection by suitably qualified personnel. RSK cannot accept liability for any subsequent change to the status of the gas membrane by follow-on trades or other construction activity.

6.3 Where not designed by RSK, the verification of protection measures is carried out with reference to the gas protection design provided by the Client. RSK assume the scope of gas protection measures as determined by third parties to be correct and to have achieved any required approval from authorities.

6.4 The Ground Gas Design Report/Remediation Strategy and Verification Plan contains details of the procedures to be adopted for inspection and validation of the works. However, it should be noted that responsibility for the correct implementation of the strategy lies with the appointed contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and validation of the works by a representative from RSK.

7. Service Constraints for Environmental Due Diligence (EDD)Reports:

7.1 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the site, therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information.

7.2 This Report describes the results of the EDD exercise. The scope of this EDD Report, where appropriate, covers legal or regulatory compliance with respect to UK or international regulations associated with environmental matters.

7.3 As with any EDD exercise, there is a certain degree of dependence upon information provided by the target company. The EDD does not include a site walkover / visit or liaison with site representatives unless identified in the Services. Therefore, the assessment is based on the available desk study information. Also, there is a certain degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this EDD exercise was performed.

7.4 This Report, including all supporting data and notes (collectively referred to hereinafter as "information"), was prepared or collected by RSK for the benefit of its Client.

7.5 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment and the site inspection visit. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the Site therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information and observations collected during the site inspection visit.

8. Service Constraints for Ground source heat energy Reports:

8.1 It is understood that this is a desktop survey only and that there are no requirements for a site walkover, service utility survey, or provision of service plans. These services can be provided upon request if required.

8.2 At a later stage, it is possible that a thermal response test (TRT) will need to be completed, for which a test borehole will have to be drilled, and these would be costed at the time. RSK can provide all aspects of subsequent site work for a GSHP system if required.

9. Service Constraints for Water Abstraction Borehole Reports:

9.1 The Report aims principally to only identify and assess the suitability of the site for a water abstraction borehole. This Report should be considered in the light of any changes in legislation, statutory requirements, and industry practices, that have occurred subsequent to the date of the Report.

9.2 Unless stated in the Report, the opinions expressed in this Report including all comments and recommendations provided are on the basis of the information obtained from a desk-based assessment.

APPENDIX B – SITE-SPECIFIC SURFACE WATER MANAGEMENT PLAN



Taylor Wimpey – South Wales

North East Cardiff, Phase 2

Construction Surface Water and Silt Management Plan

315844 R02 (00)

RSK GEOSCIENCES

APRIL 2026

RSK GENERAL NOTES

Project No.: 315844 R02

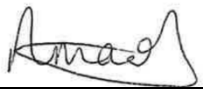
Title: Construction Surface Water and Silt Management Plan – North East Cardiff, Phase 2

Client: Taylor Wimpey – South Wales

Date: April 2026

Office: RSK Environment Limited, Old School, Stillhouse lane, Bristol, BS3 4EB

Status: Rev 00

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Rev 00	10/04/2026	First issue	n/a	see above

RSK Environment Limited (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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APPENDICES

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1 INTRODUCTION

1.1 Scope and objectives

RSK Environment Limited (RSK) was commissioned by Taylor Wimpey – South Wales (Taylor Wimpey), to produce a Construction Surface Water Management Plan (CSWMP) for Phase 2 of the residential development in North East Cardiff, located to the south of the M4, in Pontprennau, Cardiff. A site location plan is contained within **Figure 1,** and a drainage layout is contained within **Appendix B** of this report.

The approach and measures recommended within this CSWMP have been developed to provide a plan to address how surface water may be managed on site during construction, to prevent uncontrolled run-off to neighbouring surface watercourses, properties and prevent pollution resulting from discharge of silt-laden surface water into the on-site surface water drainage system and then into the surrounding surface water system.

The objectives of this CSWMP are as follows:

- Employ appropriate mitigation, including monitoring and implementation of contingencies to control and minimise surface water pollution associated with site activities.

The following aspects have been considered during the development of this CSWMP:

- The development activities that produce potential sources of surface water pollution and their point(s) of release to surface water; and
- The mitigation measures that are to be implemented to prevent, as far as is practicably feasible, the potential effect of any surface water pollution release, and details of the persons responsible for the actions at the site.

This is a 'live' document and must be regularly reviewed and amended to reflect changes or conditions on site as the development/build progresses.

It is recommended that a digital and/or hardcopy of this report is retained within each parcel site compound for reference by site staff.

This report is subject to the RSK service constraints given in **Appendix A**.

2 SITE SETTING

2.1 Site location

The wider proposed Taylor Wimpey North East Cardiff development will be undertaken in 5 phases together with the associated enabling works and construction phase works. The development scheme (planning reference: 19/02330/MJR) comprises:

A mixed use development of up to 2,500 new homes, to include affordable housing; land for employment use (B1); district centre and mixed use areas accommodating uses within classes A1-A3 (shops; financial and professional services; and food and drink outlets), B1 (business), C1 (residential institutions, including care accommodation), C3 (dwellings), D1 (non-residential institutions, including medical and health services, creches, library, conference centre, community centres and places of worship), D2 (assembly and leisure, including indoor sports facilities); one 2 FE primary school and land for a secondary school (10 FE & 6th form) comprising a total of 10 hectares; green infrastructure including formal and informal open space comprising green corridors, amenity green space, play areas, semi-natural/natural open space, woodland, allotments/community orchards and civic spaces and surface water attenuation features; highway, cycle and pedestrian routes including partial diversion/creation of public rights of way; car parking; drainage and utilities infrastructure, including diversion of the 132kv and 11 overhead electricity transmission lines traversing the site and removal of pylon structures; engineering works including ground remodelling; demolition site reclamation and removal of structures; approval is also sought for the formation of new accesses from Lisvane Road, Ty Draw Road, and Heol Glandulas/St. Mellons Road.

This CSWMP pertains to Phase 2 of the proposed development comprising residential units, areas of public open space (POS) alongside relevant infrastructure such as access roads (Pontprennau 278). Phase 2 will be completed in a staged approach across three parcels. Parcel 2A is located to the north of St Mellons Road and north of Parcel 1A referenced in the previous RSK report (315844 R01 (02)), Parcel 2B is located to the north of Parcel 2A, beyond an existing residence and is bisected by a new access road, and Parcel 2C split into two sub-parcels, one is located along the eastern boundary of Parcel 2A which has been designated for retail development and the other is to the west, beyond the new access road which extends northwards through the proposed Phase 3. Phase 2 of the development will eventually be accessed via the proposed 'Pontprennau 278' access point to the south of the development. Phase 2 is currently accessed via a private road to the north of St Mellons Road.

2.1.1 Site boundaries and surroundings

The development is located to the south of the M4 and covers a total area of approximately 135 hectares (Ha). Phase 2 of the development is located directly north of St Mellons Road (B4562) and consists of three parcels which are bound to the east by Parkwall Road and Cardiff Gate Business Park beyond. The parcels are bound to the west by agricultural fields and the wider development area to the north (Phase 3), and to the south by Parcel 1A. Phase 2 currently comprises agricultural fields separated by mature hedgerows with wooded areas and existing residence across the centre of the site, separating Parcel 2A and 2B laterally through the middle.

A tributary of the Nant Glandulas is located to the north-east of the site beyond Malthouse Wood and the Nant y Draenog is located to the west of the site.

The approximate centre of the Phase 2 development is at National Grid Reference (NGR) ST 20826 83024.

A site location plan is presented as **Figure 1**.

2.1.2 Site topography

Parcel 2A and 2C cover approximately five existing agricultural fields in total. Parcel 2A undulates gently with a general change in elevation of approximately 5.00 m from west to east. The topographical high point lies to the southeast within Phase 1, and the wider site slopes down to the north with topographical low points being the westernmost field towards the current access road east of St Mellons Road, and towards the proposed area of POS in the northeast of Parcel 2A and proposed final outfalls.

Within Parcel 2A, the site generally slopes down to the north with notable boggy ground encountered during the site walkover within the northernmost field and in the vicinity of Malthouse Wood to the north. Parcel 2B gently slopes down to the east following topographical relief towards the unnamed tributary of the Nant Glandulas. The western sub-parcel of Parcel 2C is generally flat and gently slopes to the west.

2.1.3 Environmental designations

The site (Phase 2) does not lie within a 'designated environmentally sensitive area' considered appropriate to the scope of this SWMP. However, the Lisvane Reservoirs and Embankments Site of Special Scientific Interest (SSSI) are located approximately 600m east of Phase 2 at the closest point, at a topographically higher elevation than the Phase 2 areas. Additionally, the Nant Glandulas that runs through Parcels 2B discharges to the River Rhymney, approximately 2km southwest of the site, which at its confluence is designated as a SSSI, Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site. This is located approximately 5km from the site at its closest point.

Due to the distance, risks to these designated sites, they are not deemed significant.

The western sub-parcel of 2C is bound to the west by the Nant y Draenog, with an unnamed tributary of the Nant Glandulas passing along the south-western boundary of Parcel 2B. The malthouse ancient woodland is present between phases 2A and 2B.

2.2 Site geology & hydrogeology

RSK have been provided with a copy of the following reports detailed previous intrusive ground investigations undertaken on site:

- WSP in 2020 (ref: Taylor Wimpey and NECL, North east Cardiff Ground Investigation Report, REF No. 70040356-R1, dated February 2020).
- Terrafirma in 2019 (ref: factual Ground Investigation Report: proposed development, Land to North East Cardiff, prepared for Taylor Wimpey UK Ltd and North east Cardiff Landowners Consortium, dated November 2019).

The 2020 WSP report is an interpretive report based on the findings detailed in the factual report prepared by Terrafirma in 2019. Therefore, throughout this report they will by referred to as 'the ground investigation report'.

2.2.1 Geology

Published geological maps indicate that the site is directly underlain by superficial geology comprising Till (Devension – Diamicton), defined as unsorted and unstratified drift, consisting of a heterogeneous mixture of clay, sand, gravel and boulders. This superficial geology is underlain by bedrock comprising the Freshwater West Formation (formerly St Maughan's Formation), defined as very fine to medium grained sandstones with subordinate calcrete mudstones and siltstones by the BGS. Locally to the northwest of the site and possibly encroaching the northern boundary, superficial Till is underlain by the Llanishen Conglomerate Formation which comprises red sandstones, siltstones and mudstones with beds of pebbly sandstone and conglomerate.

The ground investigation report found ground conditions on site to comprise glacial till deposits underlain by weathered bedrock between 4 m and 11 m below ground level (bgl), typically comprising firm to stiff Clay derived from weathered in-situ mudstones and sandstones.

No geological faults or other lines of geological weakness are shown to cross the site.

2.2.2 Soils

Published data from LandIS Soilscapes indicates the soil across Parcel 2A and 2C is expected to comprise slightly acidic loamy and clayey soils with impeded drainage. An area to the north of Parcel 2B is mapped to comprise slowly permeable seasonally wet slightly acidic but base-rich loamy and clayey soils.

As near surface soils are clay rich, soils are therefore unlikely to allow water to soakaway and excavations are likely to hold rainwater and require over pumping. Additionally, the clay rich surface soils present a higher risk of suspended solids becoming mobilised within surface waters during the construction phase.

No exceedances of Commercial or Residential General Acceptance Criteria (GACs) were detected in soil samples taken during the ground investigation.

2.2.3 Hydrology and Hydrogeology

The underlying bedrock geology at the site is classified as a Secondary A Aquifer.

The site is not located within a groundwater source protection zone (SPZ).

The ground investigation report describes groundwater strikes being encountered across Parcel 2A between 7.30 m below ground level (bgl) and 9.10 m bgl within boreholes and groundwater ingress was not encountered within trial pits.

Soakaway tests conducted in six trial pits across the wider site failed, showing poor permeability of soils and likelihood for excavations to hold water during construction phase.

Soil leachate analysis compared to Water Quality Standards (WQS) shows no exceedances within the proposed Phase 2 development area.

Groundwater sample analysis also showed no WQS exceedances within the proposed Phase 2 development area.

A number of water samples were taken from surface water bodies and analysed for contaminants. Samples were collected at four locations across the wider development area. These were taken from a large tributary of the Nant-Ty-Draw in the northwest of the wider development, a northern point of the Nant Glandulas, in the north of the wider development, a point just west of the Nant-y-Draenog, south of St Mellons Road, and a small watercourse in the south of the wider development, northwest of the Lisvane Reservoirs. The results showed copper to be detected above the WQS in the surface water samples. As the concentrations are similar to those detected in groundwater across the site and the same order of magnitude to the GAC, these elevated concentrations are considered to represent background concentrations. The ground investigation report assessed risk to controlled groundwaters to be low, with concentrations observed considered to be reflective of background concentrations. In addition, the risk was assessed as low, as elevated concentrations were detected during one monitoring round only and were not considered to be representative of potential contamination issues.

The Nant y Draenog runs north to south along the western boundary of Parcel 2C, with an outfall to the Afon Rhymni. The river becomes a designated Statutory Main River following its confluence with the Nant Glandulas in Parcel 1C.

The nearest surface water feature is an existing pond located in the west of the site which will be adopted into the development and has an outfall with the Nant y Draenog. A tributary of the Nant Glandulas appears to flow from east to west beyond the northeastern corner of Parcel 2B. There are no identified surface watercourses within the Parcel 2A development area.

2.3 Site drainage arrangements

The wider site is to be developed largely for residential land use, with the addition of two new schools and a commercial district centre, all with associated infrastructure, hardstanding, and areas of soft landscaping.

The site drainage arrangement design has yet to be finalised for the development. A high level drainage strategy, provided in **Appendix B**, indicates the location of permanent attenuation basins, indicative outfalls for said basins and indicative swale features. The arrangements for each parcel of the Phase 2 development are outlined below.

Parcel 2A

Site drainage arrangements are to comprise surface water gullies that drain into a series of swales located along the northern boundary of the parcel. These swales will then drain into attenuation basin Q, located directly to the north of the central section of Parcel 2A, which will discharge into the Nant Glandulas via a new outfall (OF13a). The western section of Parcel 2A will eventually share Basin L with Parcel 1A and discharge from OF13 into the Nant y Draenog to the west.

Parcel 2B

Site drainage arrangements for Parcel 2B are to comprise surface water gullies that drain into a new attenuation basin, Basin P, to the east of the parcel. Basin P will discharge via

a new headwall, with outfalls indicated to be to a be OF16a to the northeast of the parcel which eventually feeds into the Nant Glandulas.

Parcel 2C

Site drainage arrangements for the retail parcel, Parcel 2C to the east of Parcel 2A, are to comprise surface water gullies that drain to proposed below ground cellular attenuation storage or basins, subject to final development layout. These will have an outfall with either Basin T or Basin S to the northeast of Parcel 2A and in the case of Basin S have a shared basin with the residential parcel. Basin T will outfall at OF14 and Basin S will outfall at OF15 along the same man-made watercourse in the area of POS to the northeast, which will eventually form a confluence with the Nant Glandulas.

The western section of Parcel 2C which is separated to the west by the central residential Parcel 2A, will outfall into Basin N which has a basin headwall with the Nant y Draenog at OF12.

The final discharge point and outfall references for each of the three parcels are provided in Table 1 below. Exact locations and grid references are to be confirmed.

No water will be discharged off-site until an appropriate environmental permit has been obtained for each of the discharge points.

Surface water discharges from the site will be rainfall dependent and consist of run-off from the active development area, including haul roads, building footings and areas of disturbed/exposed ground (following the installation of below ground infrastructure and the raising of site levels to finished floor levels (FFL)) and, run-off from completed sections of the site.

2.4 Environmental Legislation background

Discharge of surface water from the site during the construction phase is considered a trade effluent and, as a result is a permitted activity under the Environmental Permitting Regulations, 2016. A bespoke environmental permit should therefore be obtained prior to discharging surface water from the site during the construction phase.

Surface water discharged from the site should be free from contaminants and contain less than 40 mg/l of total suspended solid (TSS). Any exceedance above this level is considered unacceptable. It is only possible to work out the concentration of suspended solids from laboratory testing. However, any cloudiness from sediment observed visually is likely to represent an exceedance of the guideline standard. Therefore, on a visual observation basis, construction sites should only discharge clear, unpolluted water into surface watercourses, in conjunction with the necessary permitting.

2.5 Site discharge locations and discharge rates

Site surface water run-off will be discharged from the site boundary via a total of 6No. discharge points, as agreed for the final site layout via the planning approval process, with final outfalls from the completed development to unnamed drainage ditches, the Nant y Draenog and the Nant Glandulas that intersect the wider development. The approximate discharge point locations and discharge rates are set out in **Table 1**.

Table 1: Discharge points

Associated parcel	Discharge Point	Preliminary Easting/ Northing	Discharge Rate (l/s)
2A	OF13	320347, 182993	48.70
	OF13a	320807, 183113	9.50
2B	16a	320619, 183169	5.12
2C	OF12	320215, 182822	8.75
	OF14	320796, 183135	7.70
	OF15	320785, 183169	6.3 increased to 18.20 once commercial area comes online

Depending on site arrangements, flow rates shall be controlled by utilising the physical restricted channel infrastructure, via the permanent outfall.

3 SENSITIVE RECEPTORS

3.1 Identified sensitive receptors to surface water pollution

A review of published Ordnance Survey (OS) mapping data and a walkover of the site and its surroundings, indicates the following primary sensitive receptors to surface water pollution:

- The Nant Glandulas and associated environmentally sensitive sites located downstream.
- The Nant y Draenog.
- The adopted basin to the west of the site (Basin N)
- Off site swales and Basin Q
- Off site swales and Basins S and T
- The secondary A aquifer

Secondary receptors associated with site discharge activities include:

- Residents in completed phases (upon completion and occupation).
- Wider public highway realm off site beyond the construction site entrances and site boundaries.
- Residents beyond the site boundaries within existing properties.
- Malthouse Wood downgradient to the north of the site which is designated Ancient Woodland.

3.2 Potential sources of pollution

The principal sources of potential sediment pollution to the identified receptors is silt run off from the on-site ground works, infrastructure and residential plot construction activities. Particular point sources will occur when any plant tracking over exposed soils, excavation or in-ground works are undertaken in the active build areas.

Additional sources of potential pollution include:

- Leaks/spills of hazardous materials (oils and fuels) associated with the construction process
- Spills of collected/ponded waters containing sediment; and
- Vandalism resulting in release of contaminants stored in containers on site.

Plausible pathways for silt pollution to impact the identified receptors include:

- Direct surface run-off; and
- Discharge via installed below ground drainage infrastructure.

4 RISK ASSESSMENT

A risk rating is provided as guidance to the level of risk associated with silt pollution to the surrounding water environment receptors from the identified sources. The risk rating assesses a number of risk factors in line with the source-pathway-receptor model. It assesses the sensitivity of any identified receptor and combines that a with hazard consequence and probability to classify the risk rating as high, medium or low.

High: Indicates the positive identification of a sensitive receptor and / or the likelihood of a potential risk to the surrounding environment.

Medium: Indicates the potential identification of a sensitive receptor or the likelihood of a potential risk to the surrounding environment.

Low: Indicates the limited identification of a sensitive receptor or the likelihood of a potential risk to the surrounding environment.

Based on the identified risk rating, plans will be developed and implemented to treat, control and minimise risk.

Table 2 below presents a risk rating and assessment for construction phase surface water risks for the site.

Table 2: Risk Rating and Assessment

RISK RATING AND ASSESSMENT			
Risk Factor	**Identified**	**Detail**	**Risk Rating**
Sensitive Receptors			
Visible flowing water course within 100 m of site boundary and category of watercourse.	**Yes**	The Nant Glandulas and Nant y Draenog flow through wider the site area.	**High**
Discharge from site flows directly into a water course	**No**	All discharge from site will flow into attenuation basins and/ or swales prior to being discharged at various headwalls into a watercourse or proposed watercourse.	**Medium**
Water course contains visible aquatic life (fish etc.) or has been assessed as environmentally sensitive	**No**	No specific assessment provided. Site or adjacent watercourse does not lie within an environmentally sensitive area.	**Low**
Local water course used as local amenity, fishing, canoeing, boating, swimming	**No**	No local recreational watercourses.	**Low**
Likely volumes of temporary discharge will exceed those designed for the final discharge consent	**No**	Temporary run-off to the proposed surface water drainage system is unlikely to exceed calculated final discharge rates during storm events during the construction phase. Surface water attenuation basins and swales must be installed at the start of the build program.	**Low**
Consortium site with shared collection and discharge outlets	**No**	Site is not a consortium.	**Low**
Treatment of water discharge is likely to be required to achieve the quality standard of acceptability	**No**	Chemical treatment is not proposed at present.	**Low**
Designated environmentally sensitive sites and Sensitive Receptors located downstream from the development.	**Yes**	Malthouse Wood (Ancient Woodland).	**Medium**
Ground Conditions and Topography			
Soils investigation identifies clay / silt (impermeable materials)	**Yes**	British Geological Survey (BGS) mapping indicates that the Site is underlain by Freshwater West Formation (formerly St Maughan's Formation) and Llanishen Conglomerate. Soils likely to contain significant clays and silts.	**High**
Site exposed, or at high altitude, or steep gradient.	**Yes**	Within the western field (proposed Parcel 2C area) the site slopes abruptly towards the current access road connected to St Mellons Road. The wider 2A parcel slopes gently towards the northern field and boundary with Parcel 2B.	**Medium**
Soils investigation identifies on-site contamination that may pose as risk to controlled waters	**Yes**	The ground investigation report provided to RSK identified exceedances of WQS of metals in groundwater across the wider site, these were largely attributed to be background concentrations.	**Medium**
Groundwater level detected at installed drainage pipework depths	**Yes**	Groundwater was encountered across a number of shallow positions across wider site but encountered at 7.30 m and 9.10 m bgl within the deeper borehole positions in Parcel 2A given its elevation in relation to the wider site area.	**Medium**
Rainfall and Flooding			
Rainfall prediction in location relatively high	**Yes**	The average annual rainfall for the Cardiff area between 1991 and 2020, as provided by the Met Office, is 1203mm, with 153 days of rainfall ≥ 1mm.	**Medium**
Historical evidence indicates site suffers from seasonal flooding	**No**	The site is not located within a flood zone.	**Low**
Development Constraints			
Does the development require a programme of earthworks to change / modify site levels	**Yes**	Earthworks required to change levels across site.	**Medium**
Construction of attenuation basins programmed for construction within 3 months of development commencement.	**Yes**	Site attenuation basins to be constructed as soon as possible following commencement of construction phase.	**Low**
Potential Pollution Risk Rating			
It is considered that Site should be classed as **'High risk'** during the remaining build owing to: 1. Number of and proximity to sensitive receptors 2. Site geology 3. Site topography			

5 SURFACE WATER DISCHARGE CONTROL MEASURES

5.1 Introduction

The potential sources, pathways and receptors to surface water pollution, associated with discharges from the site, have been considered and assessed for Phase 2 of the North East Cardiff development and associated infrastructure.

To prevent unacceptable surface water pollution and reduce the risk of surface water pollution incidents or accidents, the following control measures will be employed at the site, as required and will be reviewed on a regular basis.

Taylor Wimpey and/or their appointed contractor shall be responsible for the implementation of appropriate control measures.

5.2 Procedural & management control measures

The following procedural and management control measures shall be implemented as appropriate depending on the progression of construction activities within any particular phase:

5.2.1 Earthworks and site strip

- Where possible, the site should be worked in sections, with vegetation/topsoil strip undertaken only when each section is actively undergoing construction;
- A vegetated (where feasible) buffer should be left around the parcel boundaries;
- Where possible, excavation for installation of retaining features should be undertaken during periods of dry weather;
- Ensure that heavy good vehicles (HGVs) being utilised to remove any soils from site can gain clear access to the loading point(s) via hardstanding, to prevent driving over soft ground to prevent tracking of soils and silt remobilisation and transfer;
- Ensure that HGVs are parked as close to the loading point as possible, away from existing highway gullies, to prevent spoil from falling into gullies and being spread on highways; and
- A road sweeper should be available and in use for the duration of all earthworks to cover the hardstanding onsite and the surrounding highways.

5.2.2 Soil stockpiling

If large stockpiles are likely to be retained on site for significant duration. Where stockpiles are retained on site, it should be ensured that:

- Utilise topsoil/subsoil stockpiling procedures to ensure that the number and condition of stockpiles maintained on site are closely maintained and monitored in accordance with DEFRA guidance on industry best practice for topsoil storage during the construction phase.

- Locating stockpiles in designated areas as far as practicably feasible, away from sensitive water receptors, onsite attenuation basins, the site boundary and surface water drains.
- Seal stockpiles to prevent water ingress.
- Sediment collected via passive measures will be stockpiled in designated locations for appropriate disposal or (if appropriate approval received) subsequent re-use on site.
- If required, silt fencing shall be installed around stockpile(s) to control run-off.
- If required or applicable, stockpiles can be seeded or covered with an appropriate covering to provide additional stability, prevent water ingress, and reduce the potential for sediment run-off and dust generation. However, this is only likely to be necessary if significant run off occurs and if stockpiles are to remain for an extended period of time.

5.2.3 Surface water management infrastructure

- Installation of appropriate surface water management infrastructure, including temporary surface water attenuation basins, discharge points and road drainage infrastructure will be undertaken, as far as is practicable, as a priority and early in the construction programme when commencing activities in active construction areas.
- Installation and maintenance of physical mitigation and management control measures, as set out in **Section 5.3**.
- Any pre-existing land drainage pipework, identified during construction activities, will be noted and sealed to prevent preferential flow pathways that bypass surface water protection measures.
- Installed surface water drainage infrastructure will be regularly inspected and appropriately cleaned, when required, to remove excess sediment and maintain surface water drainage rates/capacity.

5.2.4 Dewatering of excavations

Dewatering of excavations during the construction works without appropriate water treatment can result in significant pollution of controlled waters. Due to the site geology, dewatering is considered likely to be required across the development. If dewatering is required then waters impacted with silt-contamination should not be discharged into the surface water system, or directly to the off-site water courses. Natural Resources Wales (NRW) adopt the Environment Agency's regulatory position statement (RPS) "Temporary dewatering of excavations to surface waters" 261, January 2023, which requires discharged water to:

- Be clean water, for example clear rainwater or infiltrated groundwater which has collected in the bottom of temporary excavations.
- Not result in water containing fine or coarse suspended solids (silty water) entering surface water.
- Not last more than three consecutive months (the activity may stop and restart, but the clock does not restart) – if the activity is likely to go over three consecutive months, then a permit must be applied for.

- Be made to surface water, such as a river, stream or the sea.
- Have a method statement that minimises the risk of pollution.

The discharge must not:

- Pollute surface water.
- Contain any chemical dosing agents, flocculants or coagulants.
- Be from a site which is contaminated by oil, metals, hydrocarbons, solvents or pesticides or other polluting substances.
- Result in the spread of non-native invasive species, parasites or disease.
- Cause flooding from surface water.
- Cause erosion of the banks or bed of the receiving watercourse.
- Contain concrete wash water even if it has been treated.
- Contain site drainage from surface areas such as haul roads, storage or working areas.
- Be from a site with naturally elevated concentrations of substances which exceed environmental quality standards.

If active pumping of water from footing trenches is necessary, care needs to be taken that water will not be discharged direct to surface water drains without prior treatment to remove silt to <40 mg/l.

Importantly, following three months, an environmental permit is required for continued pumping and discharge. The statutory appraisal time for permit applications may be up to 12 months.

- Where dewatering of excavations is required, water will be pumped through a dewatering bag.
- Dewatering activities will immediately cease in the event of significant sediment levels, which pose a risk to identified receptors are observed leaving the dewatering arrangements.
- An alternative may be dewatering to foul sewer with the local water company's consent.

5.2.5 Site access roads, surfacing and vehicle movements

- Early installation of suitably surfaced access roads should take place, to provide a clean running surface and reduce vehicle movements over bare/exposed ground (i.e. gravel cover).
- Asphalt ramps should be installed at site entrances, particularly where they are downgradient of the wider site, in order to divert surface water away from public highways.
- Clean gravel margins should be installed on the downgradient side of all site roads to capture runoff and allow for infiltration.
- Install a suitable running surface along the site access haul road and any internal temporary access roads to reduce the likelihood of soft ground disturbance generating sediment run-off (i.e. gravel cover).

- Establish, maintain, and review vehicle movement routes across the development site.
- Minimise, as far as practicable, the movement of machinery on and off-site access roads to prevent tracking excess soil onto roads and highways.
- Prevent, as far as practicable, the movement of machinery on undisturbed ground, such as retained areas of vegetation.
- Utilisation of a road sweeper, or other suitable road cleaning equipment, on site roads, as they become completed, and surrounding public highways where necessary. Frequency of road cleaning to be continually assessed and updated as appropriate to address site conditions.
- Install a suitable surfacing in construction material storage areas, site offices and contractor car parking areas and key access points to each development phase (i.e. gravel cover).
- Utilisation of wheel washing is to be implemented ahead of junctions between the site access road and the public highway when required during the wetter months. However, waste water from wheel washing ***must not*** be allowed to enter the wider development or site surface water drains. The water must be diverted to temporary infiltration pits. The use of rumble strips to clear bulk sediment from vehicle wheels may need to be considered depending on the effectiveness of the wheel washing.

5.2.6 Surface water crossings

- Where crossings are to be made over existing watercourses, a temporary dam should be installed across the width of the water course, upstream of the proposed crossing, to allow for over pumping during installation of road crossing over the section of the watercourse where construction is taking place. It should be noted that these works will require Section 23 Consent under The Land Drainage Act 1991
- Clean stone and silt mats should be placed on the downstream side of the dam to prevent the riverbed being eroded when the dam is released.
- A two pump system should be set up to over pump the watercourse around the works area, with one pump online continuously to move water around the works area and a second pump that can be activated via a float switch, if the first is to become overwhelmed.
- Over pumped water shall be discharged to a dewatering cell arrangement comprising measures to remove any suspended sediments from the water. Pump cell measures will include passing water through a silt sock or dewatering bag, situated on a bed of gravel within an area of soft landscaping away from active construction areas.
- Consideration should be given to the placement of the dewatering cells so as not to impact on locations that may include reptiles and hibernating dormice.
- The contractor undertaking the infrastructure works to provide the watercourse crossing should provide a suitable risk assessment and method statement prior to commencing the works.
- Lose soils in the banks, exposed as a result of the works, should be protected with erosion control matting or seeding, prior to allowing water to flow along the channel.

- Water should be released slowly from the dam, upon completion of the works to ensure that the flow of water does not erode the base and sides of the channel.
- Indicative set up is shown in **Figure 2**.

5.2.7 Areas of vegetation

- Where possible, stripping of topsoil on site should be avoided until absolutely necessary, with topsoil stripped in phases through the construction.
- Landscaping of completed areas of public open space (POS), basins and swales shall be undertaken as soon as practicable following their installation.
- Placement of topsoil and seeding of completed areas should be completed at the earliest opportunity upon completion. Where conditions do not allow for seeding, coir matting (not including a woven plastic mesh) should be considered to stabilise soils and prevent mobilisation of sediment during periods of rainfall.
- Where feasible, a vegetated buffer will be maintained between the construction area and the site boundary, particularly along the northern boundary with existing residence and Malthouse Wood, which are downgradient.

5.2.8 Site personnel and documentation

The following measures are recommended for implementation to increase awareness and bring existing site documentation up to date:

- Include a detailed section relating to surface water and silt protection within the site induction folder for all phases of the work.
- Continued documented review by the site management team of the existing site conditions in relation to this CSWMP and update the requirements on a routine basis.
- The technical team to undertake documented routine site inspections and obtain support from the appointed Environmental Consultant (RSK) if/when required. This will be supported by routine inspections by the site management team, of key areas such as dewatering activities, silt mitigation measures and discharge point;
- Conduct a site pre-start meeting with all relevant parties to agree methods of working to control surface water and silt management.
- Undertake additional detailed site-based awareness training (Site Briefing / Toolbox Talk) on surface water and silt management and protection for all pertinent site staff including groundworkers. Clear guidance should be given to groundworkers on the mitigation measures discussed and expectations regarding site ‘house keeping’ to prevent pollution from occurring.

Actions reported for project personnel include:

Technical Team:

- Ensure this CSWMP is communicated to the site management team and updated as necessary.
- Ensure that the appropriate permits and watercourse consents are in place for each phase of works.

- Ensure that the surface water management measures for adjoining development parcels meet the requirements of this surface water management plan, to protect the existing watercourse and critical watercourse works, as detailed in this report.
- Regular progress meetings should be undertaken to ensure that appropriate measures are in place on this and adjoining development parcels. This should include parcel specific inspections on a frequent basis, to ensure that silt contaminated waters are not being allowed to leave each development parcel and impact the local watercourses.
- Prior to connecting newly installed surface water drainage network, an inspection of water quality and site conditions should be undertaken by the appointed Environmental Consultant (RSK).
- Undertake periodic (routine depending on weather conditions) site inspections and regular reviews of site inspection documents, undertaken by the site manager, to identify potential areas where additional protection is required as the site develops. This should be communicated to both the site management team and to their appointed Environmental Consultant (RSK); and
- Review contractor method statement for works in and around surface water features and obtain advice from the appointed Environmental Consultant (RSK).

Site Team:

- Ensure that a hard copy of any permits obtained for the site are held in the site office and made available, when requested, by the regulatory authority;
- Ensure the measures presented within this CSWMP are implemented by the site construction contractors. Site team to hold regular meetings to ensure that measures are in place;
- Brief sub-contractors and site operatives on effective soil and water management and their responsibilities. Site team will review all contractor method statements;
- Undertake regular documented inspections and checks to ensure the effectiveness of the pollution prevention measures, especially before, during and after heavy rainfall events, adverse weather and during the wetter seasons (winter and spring);
- Keep detailed records of all inspections, including photographs and laboratory test results (if applicable);
- Undertake weekly monitoring inspections of the condition of the watercourses, downstream from the development, ensuring pollution events are not occurring and reporting any degradation in condition; and,
- Key monitoring points have been identified as:
    i. Site entrances where the site access roads meet the existing highway.
    ii. Final discharge points where surface waters are discharged to watercourse.
    iii. On site temporary and permanent surface water basins.
    iv. On site swales.
    v. Fuel and chemical storage areas including mobile plant locations, temporary mixing stations and mortar silos.

vi. Site boundaries with existing sensitive receptors.

- Report any environmental incident (such as silt ingress to the stream/drain) and seek advice from the appointed Environmental Consultant (RSK).

Contractors:

- Ensure that this CSWMP is communicated to all relevant site teams and groundworkers.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements as well as detailed arrangements regarding increased supervision and management during adverse weather or large scale earthworks.
- Report any damage, faults or breakdowns to silt mitigation features (e.g. silt fencing) as a result of plant movement or work and arrange for repairs to be made as soon as practicable.
- Follow and implement soil and water management and pollution prevention controls as instructed by the site manager and identified in the risk assessment/method statements (RAMS).
- Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water system.

Report any environmental incident or near miss to the site manager immediately.

5.2.9 Maintenance activities

- Replacement / repair of storage equipment and site equipment/plant containing hazardous materials (e.g., fuel and oils) if damage or evidence of leaking is observed.
- Site plant will be inspected routinely for damage by plant users.
- Any defects noted by site personnel will be reported to the site management team so repairs can be scheduled/replacements ordered.
- All plant items and equipment will be serviced and maintained with due regard to the manufacturer's recommendations in order to minimise the risk of breakdown or leaks.

5.2.10 Hazardous material storage

- All hazardous materials, including fuel and oils will be stored in suitable containers within an appropriately bunded area and on impermeable ground in line with regulations and industry best practice.
- Mortar silos will be located in designated areas and securely bunded to prevent surface water run-off.

5.2.11 Spill control

- A supply of surface water protection and silt management equipment; including spill kits, absorbent materials, silt mats, coir rolls and silt fencing, will be maintained within the site compound / material storage for rapid deployment in the event of an emergency. If necessary, a supply of materials will also be maintained next to any

temporary works being undertaken in sensitive areas, such as in close proximity to a surface water course or a location where surface water run-off has the potential to circumvent installed protection measures.

5.3 Physical control measures

To supplement the procedural and management controls listed in **Section 5.2**, the following physical control measures listed below shall be implemented by the site management team. The implementation of these measures will be made with due consideration to site activities, build programme and commensurate to the associated risk posed by site activities.

Figure 2 visually depicts the indicative locations of large-scale long-term physical silt pollution controls on a site wide level.

Shorter duration temporary physical controls should be implemented as required during the construction process. Locations of short term controls are to be recorded on a site plan held within the site office for reference by the site management team and visitors.

Settlement testing using gel flocculant has been carried out at the site as set out in **Appendix E** with the results indicating that the use of passive mitigation measures across the site alone, are not feasible due to the requirement for five dosage points per proposed outfall. at the time of preparing the report, settlement testing for liquid flocculant was still ending. Given the current site layout, it is recommended that active treatment is sought as a practicable alternative given the lack of capacity for 5 dosage points.

5.3.1 Passive control measures

5.3.1.1 Silt fencing

- To be installed as per the site wide mitigation plan contained within **Figure 2**. Silt fencing should be installed along the southern boundary of phase 2A adjacent to Phase 1C; on the northern boundary of Phase 2A opposite basin Q and the perimeter swale; on the southern and south-western boundaries of Phase 2B; either side of the Nant Glandulas and on the northern boundary of Phase 2C.
- Silt fencing should be installed along the boundary of all watercourses during the construction of adjacent attenuation features, with a double line of silt fencing installed at the lowest topographical points of the site adjacent to the watercourses, in accordance with the progression of works as shown in **Figure 2**.
- Where considered necessary, to provide additional strength and longevity to silt fencing, supplementary measures will be installed alongside the silt fencing. This could include the installation of stock fencing along the designated silt fencing route and using the stock fencing to support the silt fencing rather than wooden posts alone.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 2**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from stockproof wire mesh fencing to reduce wind

damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix C.**

5.3.1.2 Temporary dewatering basins

- An optional location for temporary dewatering basins in Parcel 2B and 2C are indicated in **Figure 2.** The outfall of the temporary basins will be made to Basin L and T via gravity. It is recommended that Basin Q, directly to the north of Parcel 2A should be formalised as soon as practicable if additional capacity is required to supplement the development of Parcel 2A. The basins should be divided into two or three compartments bunded with a high level overflow between each compartment. This will allow natural settlement between each basin. High level overflows should be created by installing a section of pipework (minimum 300mm diameter) within each bund.
- Additional temporary basins may be utilised depending on the phasing of the works, which is yet to be confirmed.
- Bunds within the temporary basin should be constructed of clay berms protected by silt matting over the top. Alternatively, sand bags or similar could be used to construct each bund.
- The purpose of the temporary basin is to provide additional settlement capacity given the negative results from the gel flocculant testing.
- The sides of the basin should be lined to prevent remobilisation of sediment as a result of flow between compartments. Coir matting or silt mats should be used to line the sides of each compartment.

5.3.1.3 Cut-off trenches

- Cut-off trenches / silt capture channels will be installed to the north of Parcel 2A and to the northeast perimeter of Parcel 2B in lieu of swales, with a soil bund in place on its northern side. Cut-off trenches are designed to direct the water away from the boundary and towards the temporary detention basin for collection, settlement and subsequent infiltration or discharge.
- Cut off trenches may be utilised across Parcel 2A depending on the phasing of the works, which is yet to be confirmed.
- Aggregate check dams (cobble -sized) or silt matting will be placed at regular intervals, within the base of the cut-off trenches to provide additional sediment capture capacity prior to run-off entering surface water detention basins.
- Cut-off trenches will be required for the duration of the project. Therefore, consideration will be given to seeding or turfing the trench to encourage vegetation growth.

5.3.1.4 Basins and swales

- Basins and swales should be constructed as early as possible within the construction programme to allow for vegetation cover to grow prior to the basins holding surface water.

- The sides of swales and basin should be covered, seeded / planted as per the final design as soon as practicably possible, to prevent erosion and remobilisation of sediment into the surface water features.
- If the basins and swales are formed outside of the growing season, during the wetter winter months, consideration should be given to covering the basin and swale sides with turf or erosion control matting (coir), to prevent erosion and remobilisation of sediment into the surface water features.
- The base of each outfall headwall should be protected by placing clean gravel and/or silt mats to prevent the erosion and remobilisation of sediment as a result of surface water flow.
- The temporary swales / silt capture channels recommended on **Figure 2** should be seeded, turfed or covered with erosion control matting in order to prevent erosion and remobilisation of sediment.
- Regular check-dams should be installed in swales. Check-dams should be constructed of cobble-sized aggregate to prevent flowing water from remobilising the aggregate. The check-dams should have silt mats (2-3) placed immediately down-gradient of the cobbles. The check-dams should fully cover the width of the swale.
- Inlet and outfall headwalls should be protected as soon as they are installed / cast. It should be ensured that the adopted protection measures fill the full width of the headwall. Inlet protection measures should comprise a stone filled gabion basket wrapped in geotextile membrane. The gabion baskets can be supported by an additional layer of silt fence installed across the apron of the headwall, staked at either side and weighed down using sand bags.
- Reprofiling of the temporary ditches to provide the final design of the proposed swale features will be undertaken in a phased approach as sections of the development become completed.
- The swales will be landscaped as per the final landscaping strategy prior to being brought back online in the permanent state, ahead of adoption.
- Basins should be compartmentalised at regular 25.00 m intervals. Soil bunds or clean grave/aggregate with overflow pipes should be fitted. A silt mat should be placed on the down-gradient side of each bund/pipe outfall.

5.3.1.5 Gully protection

- Gully protection (gully guards) must be installed within all road gullies at the earliest possible opportunity following construction. The condition of the gully guard should be reviewed at regular intervals by the site management team to ensure they remain in good condition and replaced / cleaned when necessary. A layer of geotextile (term) should also be placed over the top of the gully guard and secured immediately beneath the metal grate cover to prevent bulk ingress of sediment to the gully. This will also prolong the effectiveness of the gully guard itself.

5.3.1.6 Road ramps

- Upon completion of the new site access roads, asphalt road ramps, or other suitable barrier features, should be installed to direct clean surface water run-off, free of

sediment, from site roads into site road gullies. This will help prevent run-off onto the existing adjacent highway.

- Surface water from active construction roads that will likely not be clean should be allowed to drain to a clean gravel margin installed along the downgradient side of the road. This will prevent silty water entering gullies.

5.3.2 Installation of physical control measures

The physical control measures discussed in **Section 5.3** will be installed in a phased approached determined by activities being undertaken across the site and the associated levels of risk posed to identified sensitive receptors.

In areas of little to no construction activity, a baseline level of protection/control commensurate with the associated risk will be installed. Remaining physical control measures will be installed as required prior to commencement of higher risk activities.

5.3.3 Passive recirculation chemical treatment measures

Where additional treatment is deemed necessary, water will be circulated through an inline pipe reactor (containing flocculant gel blocks) to remove sediment from waters within one of the attenuation area compartments, prior to discharge to the polishing channel.

A sample has been obtained from the site for settlement testing and dosing trials. These have been used to inform appropriate dosing rates and the most effective gel flocculant combination.

Design of chemical dosing mitigation measures will be provided if confirmed to be appropriate by the developers. The design of the chemical dosing will be dependent on surface water flow rates to ensure that the water is not over dosed and that an appropriate distance is maintained, post dosing, to ensure that all gel flocculant remains within the site boundary.

Active liquid treatment system

Due to the potential for water containing suspended solids to be generated during heavy rainfall events, active treatment measures may be deployed (as required and under appropriate approval from NRW) to supplement passive treatment systems. The proposed active chemical treatment system will assist with removing suspended sediment prior to discharge.

There will be no interaction between chemicals utilised in the passive and active treatment systems, where necessary the gel flocculant blocks are be removed if replaced by a liquid system.

The active treatment measures will include liquid flocculant, coagulant and pH balancer pump and treat system.

The active treatment system can be located at the proposed temporary basin to the northwestern corner of phase 2A (serving the eventual outfall at the Nant y Draenog) and at the proposed temporary basin between Basin S and Basin T (serving the eventual outfall with the Nant Glandulas), close to the attenuation area with waters pumped directly from the basin. The treated waters will then be discharged from the active treatment cell, via a clarifying unit and through a pipe to the polishing channel. In this case the polishing

channels will be the adjacent silt capture channels/swale features that feed Basin L and Basin T respectively.

The active pump and treat system would typically comprise two WTS20s and SRT10 lamella clarifiers, utilising liquid flocculant, coagulant and pH balancer. The WTS20s comprise a pump passing water through a chemical pre-treatment system, which will dose incoming water with a flocculant, coagulant, and a pH balancer (if required). The dosing rate will vary depending on the incoming volume of suspended solids within the water as it is automatically analysed, and the dosing adjusted accordingly.

The dosed water will then be distributed into SRT10 lamella clarifiers utilising a gravity based settlement system, which will remove the particles from suspension and capture them within the individual settlement tank units.

The treated water will then be discharged from the treatment system and transferred via dedicated pipework to the polishing channel to the designated discharge point.

The active pump and treat system chemical is at the time of preparing this report, still under evaluation and final details, including material safety data sheets (MSDS) will be confirmed in an addendum update to the report. Copies of the MSDS for the gel flocculant is presented in **Appendix C**.

Depending on site conditions, the pumps supporting the liquid flocculant, coagulant and pH balancer pump and treat system will operate on a float switch or manually.

The active treatment system incorporates a telemetry unit for measuring water quality and suspended sediment levels prior to discharge through the clarifier.

Active treatment systems (including supporting pumps and pipework) will be monitored and maintained in accordance with the manufacturer's recommendations. Once set up and commissioned, the equipment supplier will provide full training to the site operatives detailing operational, management and maintenance procedures. The equipment supplier will ensure that sufficient training is received prior to discharging waters from the site.

When operational, the active treatment systems will be visually inspected on a daily basis by the site management team or other appointed person.

Additional monitoring will be undertaken as required during periods of higher use, such as during periods of heavy rainfall.

Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

5.3.3.1 Polishing channel

As shown on **Figure 2**, proposed swale features should be used as a polishing channel. The soil bund placed at the northern end of the polishing channel will allow surface waters to convey through a lined polishing channel. The channel should be lined using flocculant matting for its entire length. Only the low flow section of the channel needs to be lined with matting.

Silt wattles should support the polishing channel at regular 10.00 m intervals.

A final forebay should be established at the southern end of the polishing channel of clean gravel/aggregate.

5.3.4 Maintenance of physical control measures

The physical control measures discussed in **Section 5.3** shall be maintained in their position throughout the construction period and for the duration that a risk to the identified receptors remains.

Condition and efficacy of physical control measures will be monitored and those measures, such as silt fencing and curtains, shall be replaced as required to ensure continued efficiency.

5.3.5 Removal of physical control measures

The site management team shall undertake weekly reviews of protection measures installed at the site and assess whether the level of protection remains commensurate to risks posed by site activities. Where required, advice shall also be sought from the appointed Environmental Consultant (RSK).

Physical control measures will be removed in a phased approach determined by the residual risk posed to sensitive receptors. Confirmation of the suitability to remove recommended protection measures will be sought from the Environmental Consultant, (RSK) prior to removal.

Complete removal of physical control measures will only be undertaken when the risks posed to sensitive receptors from construction related activities is negligible.

Once the risk of sediment entrained surface water, from the site construction activities, impacting the diversion channels and basins has reduced, a scheme to remove any remaining sediment, along with the physical control measures, will be implemented and completed. To enable these works, the basins and diversion channels will be bunged to prevent pollution as a result of the works. With basins and diversion channels taken offline, residual sediment will be removed from the base of each temporary surface water management feature.

Reprofiling of the temporary ditches to provide the final design of the proposed swale features will be undertaken in a phased approach as sections of the development become completed.

Temporary surface water management features will only be removed and replaced by the proposed final designed features, once the risk of surface water containing sediment, or other construction related contaminants, is removed.

Upon completion of these works, each of the proposed drainage features (attenuation basins and swales) will be landscaped as per the final landscaping strategy prior to being brought back online in the permanent state, ahead of adoption.

Removal of the temporary surface water management features will be undertaken with the aim of separating construction surface water from surface water from the completed sections of the development.

6 SETTLEMENT TEST AND DOSING TRIAL

6.1 Introduction

To help inform appropriate mitigation and management measures for the site the settlement rate for suspended solids needs to be understood. Therefore, a sample of surface water and subsoil from the site were obtained during a site visit in January 2026.

Samples were submitted to Frog Environmental Ltd (an RSK company) for testing of the rate of natural separation of the solid fraction (suspended solid) from the water. Where settlement rates are slow, a dosing trial is undertaken, which involves applying gel flocculant and liquid flocculant as an active silt control method, to bind the negatively charged silt particles, forcing them to drop out of suspension (formation of a floc).

Frog Environmental provided the dosing trial for gel flocculant and the dosing trial for liquid flocculant treatment.

The use of chemical treatment is controlled by the local environmental regulatory authority (NRW). Application and approval of a bespoke Environmental Permit under the Environmental Permitting Regulation (2016) would be required prior to deploying chemical treatment (gel flocculant) at the site.

Results of the settlement test and dosing trial are set out in **Appendix E** with associated material safety data sheets (MSDS) provided in **Appendix F.**

6.2 Frog Environmental Settlement test

The turbidity of each sample is measured in Nephelometric Turbidity Unit (NTU).

Natural settlement rate of the sample obtained from the New eastern Villages site, measured over a 24-hr period is set out in **Table 3**.

Table 3: Natural Settlement Rates

Sample Location	Initial Turbidity (NTU)	NTU after 10 min settlement	NTU after 30 min settlement	NTU after 24-hr settlement
Site Subsoil	804	734	552	66

Results of the natural settlement test, indicate that settlement did not produce clear water even after a 24-hr period. Unless large amounts of attenuation can be utilised and weather and flow managed over multiple days, natural settlement is unlikely to be feasible on the site.

6.3 Dosing Trial

The testing of chemical treatment, via a dosing trial, is undertaken alongside a control sample. Samples are tested against different gel flocculant blends with reaction times and flocculant type recorded.

Samples are agitated repeatedly to gain a good indication of the reaction time required to settle the suspended solid. Frog Environment Ltd (an RSK company) then report the most effective blend of gel flocculant chemical treatment.

Where the use of gel flocculant is recommended, the use and implementation of it on site will be dependent on location of use and flow rates and will likely alter throughout the construction process, with 'fine tuning' to the deployment required.

Testing of samples indicated that a gel flocculant blend of product Gel - 494 and Gel – 360 would be the most effective. Testing indicated that a four stage dosing was insufficient to remove suspended solids to the required turbidity. This suggests that flocculants by themselves cannot be relied upon as a treatment method, and supporting natural attenuation in basins will be required. This must also be supported through procedural processes to minimise, as far as is practicable, the entrainment of silt into water.

As noted in **Section 5.3** and detailed in **Appendix E**, the use of gel flocculant by itself will not provide sufficient treatment to remove suspended solids without additional attenuation capacity. The results of the liquid flocculant trial are still awaited.

7 SURFACE WATER DISCHARGE MONITORING AND RECORDING

7.1 Surface water monitoring

The following monitoring procedures will be carried out weekly during dry conditions and daily during periods of rainfall, by the site management team, to enable continuous review of site management practices.

A comprehensive record of the effectiveness of surface water management measures should then be maintained to enable further review by any parties attending site.

Any emissions to surface water identified will result in the implementation of the protocols detailed herein. Any complaints in relation to surface water emissions will be fully investigated as detailed in the following sections. The resultant actions will be recorded in site records.

7.1.1 Meteorological conditions

Meteorological forecasts and weather conditions (including precipitation) will be monitored to identify high rainfall events, which could result in elevated site water levels to be predicated, and appropriate additional management measure implemented.

7.1.2 Regular inspection and monitoring

Due to the nature of the development, visual monitoring techniques will principally be used within the boundary of the site utilising the inspection checklist provided within **Appendix D,** or similar. These should be supplemented by the collection of water samples from the final outfall locations, prior to water entering the off-site surface water features, where safely and practicably accessible.

Weekly visual inspections of surface water discharge quality as well as the overall condition of the wider site will be undertaken as part of general site walkovers completed by the site management team and site operatives during their daily tasks.

Additional monitoring beyond the site boundary, above the monitoring at the discharge points, will be completed in response to the identification of potential emissions to surface water from the site or upon receipt of complaints. All monitoring will be carried out in cognisance of the prevailing weather conditions and site activities.

In addition to this, weekly routine inspections of the site to monitor and record surface water run-off quality and other environmental issues will be undertaken by the site management team or other appointed person. Records of these inspections will be kept for the duration of the project.

Inspection frequencies will be increased as required in response to prevailing meteorological conditions.

7.2 Water sample collection and testing

To supplement the regular visual inspection and monitoring of surface water discharges from the site, instantaneous (spot) samples of discharged water shall be collected by the site management team (or nominated deputy) for analysis to confirm it adheres to emission limits presented in **Table 4**.

When sampling is undertaken, a sample of water will be obtained prior to water leaving the active construction site boundary. Sampling of water is not considered to be a requirement at this stage. Therefore, the purpose of the sampling is to provide the land owner (Taylor Wimpey South Wales) and their principal contractor with the confidence that water being discharged is below the parameters as set out in **Table 4.**

Water quality will be visually inspected from upstream and downstream locations from the operational discharge points. Records of the discharge points monitored and sampled will be retained by the site team. Samples collected for laboratory analysis will be tested for the determinants and limits presented in **Table 4**.

Table 4: Discharge Point Monitoring Parameters and Limits

Parameter	Limit (Including Unit)	Compliance Statistic
Total suspended solids	60 mg/l	Maximum
pH	6 to 9	Minimum and maximum
Oil and grease	None observed	-

Where confirmation is required to determine if a potential surface water emission has occurred, supplementary monitoring will be undertaken. This will comprise of measuring Total Suspended Solids (TSS) directly or recording turbidity (NTU) of discharged water using a suitable monitoring device, such as a portable turbidity meter.

Additionally, a portable pH meter will be utilised to provide an on-site indication of the pH level of water being discharged from the site.

7.3 Site records

In addition to regular site monitoring, the following significant events at the site will be recorded:

- Maintenance.
- Breakdowns.
- Emergencies.
- Site inspections.
- Despatch of records to Natural resources Wales (NRW).
- Severe weather conditions.
- Complaints received.
- Visitors to the site.

The site management team or nominated person(s) will maintain a record of all the above information in the site log, on inspection forms, or as part of wider environmental management records, as appropriate. They are also responsible for ensuring that management measures are maintained and repaired, as required.

All records and copies of inspection forms will be maintained and will be made available for inspection at all reasonable times by any authorised officer of NRW.

8 EMERGENCY PROCEDURE AND COMPLAINTS HANDLING

8.1 Emergency Procedure

Supplementary surface water protection measures, treatment capacity or off-site removal of surface water shall be deployed as necessary to provide additional surface water treatment/containment/management capacity.

For the build programme, and particularly in advance the winter, it is recommended that the local foul drainage provider be contacted, to determine if an agreement to pump to foul can be secured during peak rainfall conditions on an emergency basis only.

8.1.1 Spillage emergency procedure

In the event of a major liquid spillage/leak the following actions will be taken, where appropriate:

- Report the occurrence to the site management team immediately.
- Trained facility operatives to take immediate action to try and contain the spillage/leak where it is safe to do so using appropriate materials (such as spill kits).
- If it is safe to do so, the cause of the spill or leak will be isolated and/or moved to a bunded area.
- Inert material such as clay or sandbags are to be used to make a temporary containment bund to prevent pollution of any water or land.
- Drainage covers will be installed over any road gullies to prevent ingress into the site's drainage system.
- Access to the immediate area will be restricted until a disposal/clean up solution is implemented.
- If the spillage cannot be contained using approved methods, senior management will be contacted immediately, and specialist advice and help will be sought.
- If a vehicle is identified as leaking, wherever practicable, it is to be stored on an impermeable pavement within a bunded area, where the spillage can be contained until such a time as the vehicle is repaired.

Once the spillage has been contained the site management team will make necessary arrangements for the appropriate removal of the spillage from the site.

Any incidents or near misses should be reported as soon as possible so that the appointed Environmental Consultant (RSK) is notified as soon as possible. Where damaged or missing protection measures have been identified, the site manager should implement repairs or replacements as soon as possible.

Site staff should immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.

Internal Taylor Wimpey South Wales policies and procedures should be followed following any pollution incident so that the incident can be reported, appropriate details and supporting information can be collated and provided to the Environmental Regulator (NRW) and LLFA.

8.2 Complaints process

Any complaints received at the site or via the regulatory bodies (including Natural resources Wales and the Local Authority), will be recorded and investigated via a combination of visual inspection at the location of the complaint and collection of water samples for analysis to determine the source of the pollution to be identified.

Where possible, as much information and detail about the complaint will be recorded, whether this be from the relevant authority or complainant. This information will assist the investigation in determining the source of the surface water pollution.

Should a complaint be received, the following information will be gathered and recorded:

- Complaint details (including the address of the complainant where possible) and the location where surface water pollution is perceived.
- Weather conditions including rainfall levels.
- Results of the latest round of monitoring carried out by site personnel.
- Operational status of the site (noting any abnormal conditions that may have caused the complaint).
- Inspection of site conditions upon the receipt of a complaint (where feasible).
- Details of the proposed corrective action, if required.

A subsequent follow up to the complainant shall be provided, detailing whether the corrective action, if required, was successful. If not, details shall be set out of any new strategy implemented, until the issue is resolved.

Records of complaints received will be kept for inspection and review by both internal and external personnel.

In the event that surface water discharges from the site are found to be causing a pollution incident – as determined by investigation into off site complaints or during routine monitoring, the following measures will be taken to confirm the source:

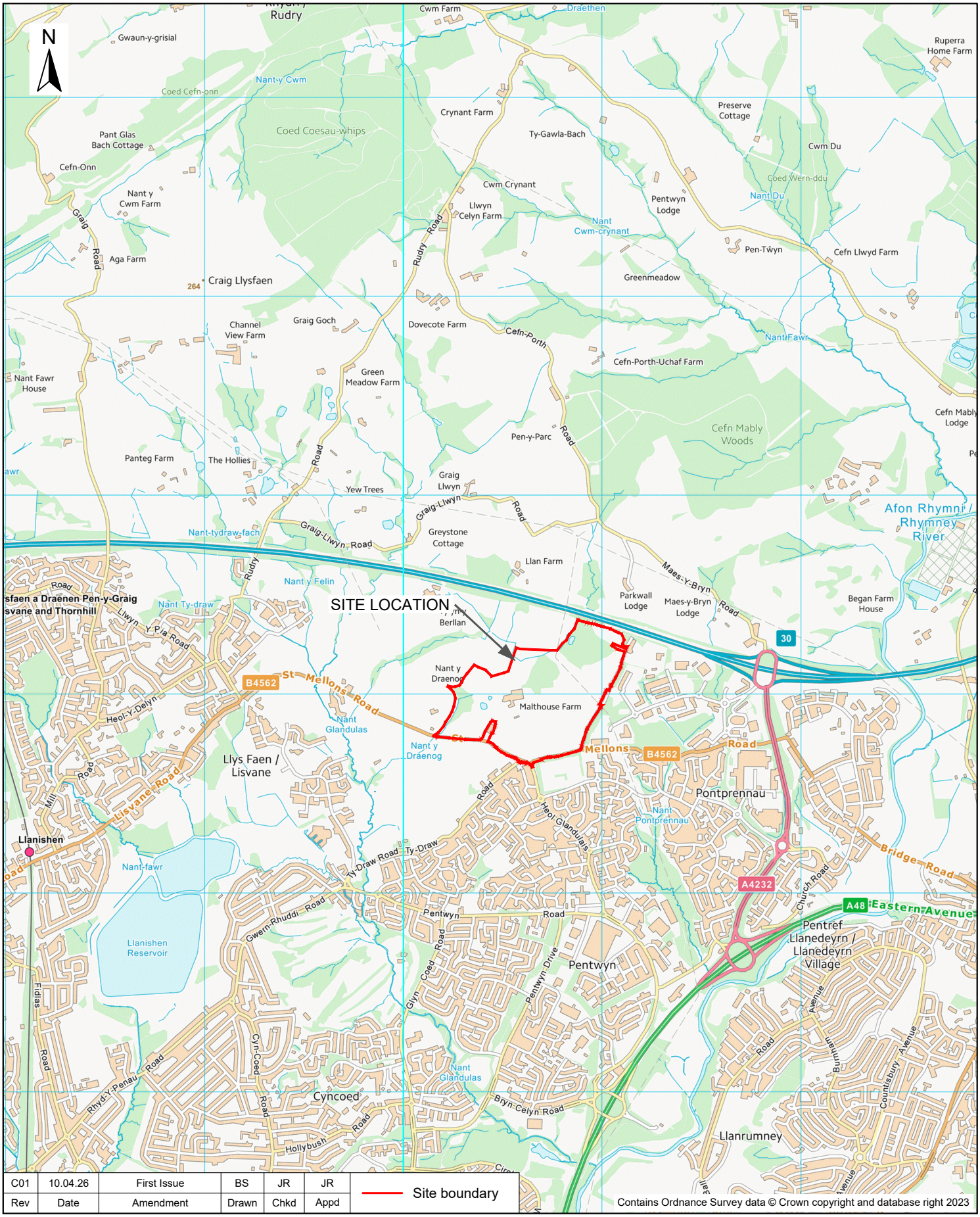
- Supplementary monitoring will be undertaken to identify the extent and potential cause of the event i.e., damage to perimeter protection measures or fault in treatment system.
- Examination of the operational activities at the site at the time of the complaint or event identification.
- Examination of the meteorological conditions at the time of the complaint or event identification.
- Examination of the process conditions via the plant operational records / telemetry (where recorded).

- A review of the operational procedure, process controls and the instigation of any control measures immediately following identification of the pollution.
- Further visual monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

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FIGURES

FIGURE 1 SITE LOCATION PLAN (315844-BL-111-XX-D-G-11102-C01)



Rev	Date	Amendment	Drawn	Chkd	Appd
C01	10.04.26	First Issue	BS	JR	JR

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Client: Taylor Wimpey South Wales

Project Name: North East Cardiff - Phase 2

Description: Site Location Plan

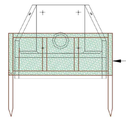
Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	320710,182973	315844	11102	C01	315844-BL-111-XX-D-G-11102-C01

FIGURE 2 PARCEL 2 SURFACE WATER MANAGEMENT PLAN (315844-BL-276-XX-D-G-27604-C01)

DO NOT SCALE FROM THIS DRAWING

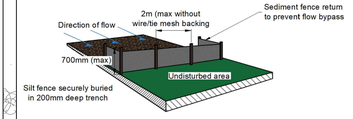
N

Silt Fence Check Dam

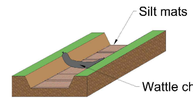


4x2" tanalised timber wooden frame to be double wrapped in silt fence material and staked to fit across the headwall apron

Silt Fencing



Silt Wattle Check Dam



Rock Filter Check Dam



Silt matting packed behind basket and weighted down with sand bags

Gabion basket tightly fitting between headwalls lined with silt fence and filled with gabion stone

CATCHMENT 23
TOTAL AREA: 0.33ha
IMPERMEABLE AREA: 0.16ha
STORAGE ON PLOT

Discharge Point No.15
Discharge Rate: 6.3 L/s
INCREASED TO 18.2 L/s
WHEN COMMERCIAL AREA
COMES ONLINE

PHASE 3c

M3

Discharge Point No.16a
Discharge Rate: 5.12 L/s

CATCHMENT 21
TOTAL AREA: 1.03ha
IMPERMEABLE AREA: 0.65ha
POND P

BASIN P
IL: 57.20m
VOLUME: 532m3

M4

Discharge Point No.14
Discharge Rate: 7.7 L/s

BASIN T
IL: 64.30m
VOLUME: 728m3

M5

BASIN S
IL: 64.50m
VOLUME: 682m3

M6

2a

CATCHMENT 24
TOTAL AREA: 1.26ha
IMPERMEABLE AREA: 0.83ha
POND S

Discharge Point No.13a
Discharge Rate: 9.5 L/s

CATCHMENT 25
TOTAL AREA: 0.17ha
IMPERMEABLE AREA: 0.10ha
POND T

PHASE 2b

CATCHMENT 13
PONDS M AND K

3b

MIXED USE BLOCK
Parking

2b

M2

Discharge Point No.13
Discharge Rate: 47.30 L/s

CHMENT 14
D M

STEPPED SWALE WITH BAFFLES TO PROVIDE 700m³ OF ADDITIONAL STORAGE

PHASE 3d

BASIN T
7.50m
OLUME: 5,750m3

M9

M7

BASIN Q
IL: 70.00m
VOLUME: 1130m3

CATCHMENT 20
TOTAL AREA: 1.92ha
IMPERMEABLE AREA: 1.31ha
POND Q

CATCHMENT 22
TOTAL AREA: 1.39ha
IMPERMEABLE AREA: 0.79ha
POND T

PHASE 2c

PHASE 2a

INFRA

STORAGE TO BE SPLIT WITHIN RETAIL PARCEL LAYOUT BUT RESTRICTED TO Q-BAR THROUGH ONSITE CONTROLS. HYDROBRAKE ON OUTFALL OF DESIGNATED POND TO BE REPLACED WITH NEW CONTROL DEVICE TO ALLOW FOR THE ADDITIONAL FLOWS.

CATCHMENT 17
TOTAL AREA: 1.77ha
IMPERMEABLE AREA: 0.83ha
POND N

BASIN M
IL: 47.50m
VOLUME: 2070m3

PHASE 2c

RETAIL PARCEL
TOTAL AREA: 1.75ha
IMPERMEABLE AREA: 1.4ha
Assmd 80% (TBC)
PARCEL DISCHARGE 11.3 L/s
ONPLOT STORAGE
REQUIRED=1050m³
(CELLULAR OR BASIN
SUBJECT TO DEVELOPMENT
LAYOUT)

M8

CATCHMENT 15
TOTAL AREA: 5.70ha
IMPERMEABLE AREA: 3.59ha
POND L

PHASE 1a

M1

BASIN N
IL: 47.70m
VOLUME: 682m3

Existing St Mellons Road

Discharge Point No.11
Discharge Rate: 35.9 L/s

Discharge Point No.12
Discharge Rate: 8.75 L/s

STEPPED SWALE WITH BAFFLES TO PROVIDE ADDITIONAL STORAGE

PIPED SECTION OF DRAINAGE TO DRAIN INTO PROPOSED SWALE

PROPOSED LEVELS IN DEVELOPMENT TO BE RAISED TO ALLOW DRAINAGE INTO CONVEYANCE SWALE

CATCHMENT 16
TOTAL AREA: 3.85ha
IMPERMEABLE AREA: 2.02ha
SWALE AND POND L

Cycle Way Link

Foul Connection - Phases 1, 3, FD (East)

PROPOSED PIPED SECTION OF DRAINAGE TO CONNECT SWALE WITHIN ACTIVE TRAVEL ROUTE TO WHOLESITE DRAINAGE INFRASTRUCTURE

PROPOSED SECTION 278 TO UTILISE RAIN GARDENS TO PROVIDE INTERCEPTION

Ty Draw Access Point

PROPOSED SWALE WITH UNDERDRAIN TO SERVE BOTH ACTIVE TRAVEL ROUTE AND

Rev	Date	Amendment	Drawn	Chkd	Appd
C01	09.04.26	First Issue	MW	JR	JR

LEGEND

- Site boundary
- Silt capture channel
- Recommended line of silt fencing
- Buffer zones
- French drain (filter drain)
- Silt wattle check dam
- Recommended line of soil bund
- Silt fence check dam
- Rock filter check dam
- M1 Primary monitoring location
- M2 Secondary monitoring location
- Anticipated direction of surface water run-off based on topography
- Surface watercourse (constructed as part of development) (Arrow shows flow direction)
- Surface watercourse (pre-existing) (Arrow shows flow direction)
- Wheel wash
- Potential treatment location

Notes:
The schematic drawing is not meant to be an accurate engineering drawing but is used to present the general relative locations of features on, and surrounding, the site. Features annotated on this schematic are not drawn to scale but are centered over the approximate location. Such features should not be used for setting out, nor should it be considered a schedule and should be considered indicative only.
Details (such as height, width or depth) of mitigation features such as bunds, grips or ditches shall be designed by the temporary works designer, accepted by the principal designer and recorded on the temporary works register in accordance with BS5975.

RSK shall not be liable for the use of this drawing, or the information contained within, for any purpose other than that which it was provided.

Base plan provided by Client
Drawing Ref.: 211109-DS-SK001_DRAINAGE STRATEGY CATCHMENTS PLAN.pdf

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Dimensions	Scale	Size
m	NTS	A1

Client: Taylor Wimpey South Wales

Project Name: North East Cardiff - Phase 2

Description: Construction Surface Water Management Plan

File Name: 315844-BL-276-XX-D-G-27604-C01

Project ID	Drawing no.	Revision
316117	27604	C01

APPENDICES

APPENDIX A
SERVICE CONSTRAINTS

APPENDIX A
SERVICE CONSTRAINTS

1. Service Constraints

1.1. This Report (the “Report”) and any study, inspection, investigation, sampling, testing and or interpretation carried out in connection with the Report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) trading as RSK Geosciences, for the Client named in the first paragraph of the Report (the "Client") in accordance with the terms of an RSK Fee Proposal including RSK Environment Standard Terms and Conditions (the “Appointment”) between RSK and the Client, unless otherwise stated in the first paragraph of the Report. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by a geo-environmental consultant at the time the Services were performed. Nothing in this Report shall be construed as imposing any fitness for purpose obligation. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the Client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.

1.2 Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services. RSK shall not be liable in respect of any action or proceedings arising out of or in connection with this Report whether in contract, in tort, for breach of statutory duty or otherwise after the expiry of six (6) years from either (i) the date of the Report or (ii) such earlier date as prescribed by law, unless varied in the terms of the Appointment.

1.3 Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent, or condone any party, other than the Client relying upon the Services. Should this Report or any part of this Report, or details of the Services or any part of the Services, be made known to any such party, and such party relies thereon, that party does so wholly at its own and sole risk, and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent geo-environmental consultant and/or lawyer.

1.4 The Client shall not, without the prior written consent of RSK, assign, transfer, charge, mortgage, subcontract, or deal in any other manner with all or any of the benefits provided in this Report. Unless specified in the Appointment, RSK shall not be obliged to assign the benefit of the Report whether by collateral warranty, third party rights pursuant to the Contracts (Rights of Third Parties) Act 1999, letter of reliance or otherwise. If RSK agrees to any assignment of the benefit of this Report, in whatever form, benefits to third parties through collateral warranties, third party rights or letters of reliance shall not be provided unless a fee for each right, warranty or letter is agreed. The form of wording used in the warranty or letter shall be provided by RSK for agreement by the Client. Any reasonable changes to the form of wording will be implemented by mutual agreement, however the terms in the warranty or letter cannot offer the third party any greater benefit than the Appointment offered to the Client.

1.5 It is the understanding of RSK that this Report is to be used for the purpose described in the introduction to the Report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the Report is used, or the proposed use of the site change, this Report may no longer be valid and any further use of or reliance upon the Report in those circumstances by the Client without the review and advice of RSK shall be at the Client's sole and own risk. RSK shall not be liable for any use of this Report for any purpose other than that for which it was provided.

1.6 The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions contained in this Report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the Report in the future shall be at the Client's own and sole risk.

1.7 The observations and conclusions described in this Report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out, or required by the Appointment between the Client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this Report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, fuel storage, persistent bio-accumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.

1.8 The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of desk based publicly available information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services and the limitations below:

a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the Client or third parties, including laboratories and information services, during the performance of the Services.

d. The Client has identified in writing to RSK, the information, reports, findings, surveys and preliminary works RSK may not rely upon when providing the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK, and including the doing of any independent investigation of the information provided to RSK, save as otherwise provided in the terms of the Appointment between the Client and RSK.

1.9 Any site drawing(s) provided in this Report is (are) not meant to be an accurate base plan for scale measurement but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for accurate setting out and should be considered indicative only.

1.10 Should RSK be requested to review the Report after the date of issue of this Report, RSK shall be entitled to additional payment at the existing rates, or such other terms as agreed between RSK and the Client.

2. Service Constraints where the Report provides an intrusive assessment of ground conditions:

2.1 The intrusive environmental ground investigation aspects of the Services are a limited sampling of soil from the site, at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this Report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent

of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope agreed between the Client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species (not tested) are not present.

2.2 The comments given in this Report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development, site usage, timescales or the Client's specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an indicative assessment of ground conditions on site. There may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

2.3 Where the Services include Investigation of an exploratory nature or relating to physical ground works, any costings and prices provided in the Report are estimated and provided for guidance purposes only. The actual cost and time quantities shall be remeasured and shall be dependent upon the ground or other conditions, constraints present, and number and depth of the investigation locations, which shall influence the number of samples and tests required, and the quantities of soil being classified.

2.4 Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works. However, this Report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

2.5 Unless stated otherwise, only preliminary geotechnical recommendations are presented in this Report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed. Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this Report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7, although this is subject to the restrictions imposed on the investigation, as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this Report will not meet the requirements of a Geotechnical Design Report (GDR) and should therefore be used for preliminary guidance only.

3. Service Constraints where the Report relates to Surface Water Management:

3.1 The Surface Water Management Inspection (SWMI) Report, documents provided, observations, actions, and recommendations, with respect to the management of potential pollution issues to surface waters, made during the site Inspection visit, are those present at the time of the visit, and may not represent those recorded by others on the same day.

3.2 The comments given in this Report and the opinions expressed are based on the weather, ground and ground water conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the inspection and therefore could not be taken into account. In addition, groundwater levels and flows, may vary from those Reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

3.3 RSK places a degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this Report was prepared.

3.4 This Report is a live document, to be continually reviewed and updated as the development progresses or other changes occur on site. RSK can only maintain the currency of this Report through the Client requesting support with supplementary site visits or attendance at meetings ahead of key stages of the development in relation to surface water management. Our risk rating assesses a number of risk factors in line with the source-pathway- receptor model and is therefore subject to constant change.

3.5 Standard design drawings are indicative. Material types, dimensions and construction details will need to be adjusted by the Client to suit the specific conditions / flows on Site.

3.6 The full responsibly for implementing the site-specific protection and maintenance measures to protect the surface water system as stated in this Report, remains with the Client and their site management team. Additional control measures may be required to achieve the objectives set out in the Surface Water Management Plan to be implemented and financed by the Client.

4. Service Constraints where the Report relates to Waste Management:

4.1 In accordance with the definition provided in the Waste Framework Directive (WFD), materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded, by the holder'. Naturally occurring soils are not considered waste if re-used on the site of origin for the purposes of development. Soils such as made ground that are not of clean and natural origin (irrespective of whether they are contaminated or not) and other materials such as recycled aggregate, do not necessarily become waste until the criteria above are met. Excavation arisings from the development may therefore be classified as waste if surplus to requirements and/or unsuitable for re-use.

4.2 It is the duty of the waste producer, to ensure that all waste is accurately classified prior to waste disposal. Technical Guidance WM3 (EA, 2018) sets out in its Appendix D requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity. Unless otherwise stated, the waste assessment presented in this Report should be considered as preliminary and further testing and assessment of the waste under the provisions of a Waste Sampling Plan may be required to obtain the necessary level of data required for basic characterisation of the waste in support of disposal.

4.3 Unless stated otherwise in the Report, information relating to historical operations at the site was not reviewed as part of the assessment by RSK. In addition, unless otherwise stated in the Services, RSK was not present during the collection of the samples nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this Report are based solely on any information that were provided to RSK (e.g., laboratory chemical data, exploratory hole records) and were completed without prejudice for our Client.

4.4 RSK's assumes that any ground investigation data, chemical testing results etc., that were provided by the Client to inform the waste assessment and supporting review were carried out in accordance with current best practice and relevant guidance/ standards, where applicable. Thus, the

comments given in this Report and the opinions expressed are based solely on the information provided by the Client. However, it is noted that there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account as part of the RSK assessment.

5. Service Constraints for Construction Environmental Management Plan Reports:

5.1 This Report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

5.2 The measures and comments outlined in this Report and any opinions expressed are based on the plans provided at the time and discussions with relevant parties. However, there may be conditions pertaining to the site that have not been disclosed by investigations and therefore could not be taken into account.

5.3 This CEMP is a live document and is subject to change throughout the project, as and when necessary, to ensure management of environmental aspects remains relevant, and to ensure continued compliance with legislation and commitments as they may change. RSK understands that this CEMP will be reviewed by the Client every six months and updated as and when necessary.

5.4 It is the full responsibility of the Principal Contractor/ Client to ensure that their works do not contravene legal requirements, and adherence to this CEMP alone cannot be a full defence regarding legal action against the Principal Contractor.

6. Service Constraints where the Report relates to Ground Gas Membrane Verification:

6.1 This Report is limited to the verification of the gas resistant membrane/vapour membrane/ radon barrier after installation and no inspections were undertaken of the substrate (i.e. prepared ground). The Report therefore does not constitute as a full verification of ground gas protection system.

6.2 The comments given in this Report and the opinions expressed, are based on the condition of the ground gas membrane as encountered at the time of inspection by suitably qualified personnel. RSK cannot accept liability for any subsequent change to the status of the gas membrane by follow-on trades or other construction activity.

6.3 Where not designed by RSK, the verification of protection measures is carried out with reference to the gas protection design provided by the Client. RSK assume the scope of gas protection measures as determined by third parties to be correct and to have achieved any required approval from authorities.

6.4 The Ground Gas Design Report/Remediation Strategy and Verification Plan contains details of the procedures to be adopted for inspection and validation of the works. However, it should be noted that responsibility for the correct implementation of the strategy lies with the appointed contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and validation of the works by a representative from RSK.

7. Service Constraints for Environmental Due Diligence (EDD)Reports:

7.1 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the site, therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information.

7.2 This Report describes the results of the EDD exercise. The scope of this EDD Report, where appropriate, covers legal or regulatory compliance with respect to UK or international regulations associated with environmental matters.

7.3 As with any EDD exercise, there is a certain degree of dependence upon information provided by the target company. The EDD does not include a site walkover / visit or liaison with site representatives unless identified in the Services. Therefore, the assessment is based on the available desk study information. Also, there is a certain degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this EDD exercise was performed.

7.4 This Report, including all supporting data and notes (collectively referred to hereinafter as "information"), was prepared or collected by RSK for the benefit of its Client.

7.5 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment and the site inspection visit. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the Site therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information and observations collected during the site inspection visit.

8. Service Constraints for Ground source heat energy Reports:

8.1 It is understood that this is a desktop survey only and that there are no requirements for a site walkover, service utility survey, or provision of service plans. These services can be provided upon request if required.

8.2 At a later stage, it is possible that a thermal response test (TRT) will need to be completed, for which a test borehole will have to be drilled, and these would be costed at the time. RSK can provide all aspects of subsequent site work for a GSHP system if required.

9. Service Constraints for Water Abstraction Borehole Reports:

9.1 The Report aims principally to only identify and assess the suitability of the site for a water abstraction borehole. This Report should be considered in the light of any changes in legislation, statutory requirements, and industry practices, that have occurred subsequent to the date of the Report.

9.2 Unless stated in the Report, the opinions expressed in this Report including all comments and recommendations provided are on the basis of the information obtained from a desk-based assessment.

APPENDIX B
DRAINAGE LAYOUT

NORTH EAST CARDIFF - CARREG COETIR

DRAINAGE STRATEGY

Event	50ha (l/s)	1ha (l/s)
1 Year	363.05	7.26
QBar	412.56	8.25
100 Year	899.38	17.99

Catchment	Developed Area (ha)	Impermeable Area (Ha)	1 in 1 Year Runoff (l/s)	QBar Runoff (l/s)	1 in 100 Year Runoff (l/s)	BASIN	DISCHARGE POINT
1	2.78	1.67	12.12	13.78	30.04	A	01 (13.78 l/s)
2	1.64	0.98	7.12	8.09	17.63	B	02 (8.09 l/s)
3	2.23	1.34	9.73	11.06	24.11	C1/C2	03 (11.06 l/s)
4	4.86	2.92	21.20	24.09	52.53	D	04 (29.21 l/s)
5	1.04	0.62	4.50	5.12	11.15	D	04 (29.21l/s)
6a	3.83	2.30	16.70	18.98	41.38	E1	05 (19 l/s)
6b	1.39	0.83	6.02	6.85	14.93	E2	07 (6.85 l/s)
7	3.56	2.14	15.54	17.66	38.50	F	06 (17.7 l/s)
8a	4.83	2.90	21.05	23.93	52.17	G1	08 (23.93 l/s)
8b	2.08	1.25	9.08	10.31	22.49	G2	09a (10.31 l/s)
9	6.02	3.61	26.21	29.78	64.94	H/Hα/J	09 (50 l/s)
10a	1.21	0.73	5.30	6.02	13.13	H/Hα/J	09 (50 l/s)
10b	1.75	1.05	7.62	8.66	18.89	I2A/I2B/I2C	10 (24.1l/s)
11	3.11	1.87	13.58	15.43	33.64	I2A/I2B/I2C	10 (24.1l/s)
12	2.86	1.72	12.49	14.19	30.94	H/Hα/J	09 (50 l/s)
13	3.86	2.32	16.84	19.14	41.74	K/M	11 (35.9 l/s)
14	3.39	2.03	14.74	16.75	36.52	K/M	11 (35.9 l/s)
15	5.70	3.42	24.83	28.21	61.53	L	13 (48.7 l/s)
16	3.85	2.31	16.77	19.06	41.56	L	13 (48.7 l/s)
17	1.49	0.89	6.46	7.34	16.01	N	12 (8.75 l/s)
17a	0.28	0.17	1.23	1.40	3.06	L	13 (48.7 l/s)
18	1.89	1.13	8.20	9.32	20.33	O	17 (9.3 l/s)
19	0.51	0.31	2.25	2.56	5.58	Oa	16 (2.6 l/s)
20	1.92	1.15	8.35	9.49	20.69	Q	13a (9.5 l/s)
21	1.03	0.62	4.50	5.12	11.15	P	16a (5.12 l/s)
22	1.39	0.83	6.03	6.85	14.93	T	14 (7.7 l/s)
23	0.33	0.20	1.45	1.65	3.60	S,O,P	S,O,P
24	1.26	0.76	5.52	6.27	13.67	S	15 (6.3 l/s)
25	0.17	0.10	0.73	0.86	1.80	T	14 (7.7 l/s)

KEY

- Site Boundary
- Existing Residents (Access)
- Buildings demo
- Cycle Way Link
- Existing St Mellons Road
- SW Outfall
- Foul Connection
- River
- Swales
- Connections
- Catchment 1
- Catchment 2
- Catchment 3
- Catchment 4
- Catchment 5
- Catchment 6a
- Catchment 6b
- Catchment 7
- Catchment 8a
- Catchment 8b
- Catchment 9
- Catchment 10a
- Catchment 10b
- Catchment 11
- Catchment 12
- Catchment 13
- Catchment 14
- Catchment 15
- Catchment 16
- Catchment 17
- Catchment 17a
- Catchment 18
- Catchment 19
- Catchment 20
- Catchment 21
- Catchment 22
- Catchment 23
- Catchment 24
- Catchment 25
- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Main Road
- Future Development
- Education
- Employment
- 527B/ 38 Access
- Bridge/ Culvert
- Bus Link
- Extraction Point

PHASE 1a
PHASE 1b
PHASE 1c
PHASE 2a
PHASE 2b
PHASE 2c
PHASE 3a
PHASE 3b
PHASE 3c
PHASE 3d
PHASE 4a
PHASE 4b
PHASE 4c
PHASE 5a
PHASE 5b
2a
2b
3a
3b
INFRA BY SEPT '31
INFRA BY SEPT '32
INFRA BY MAR '28
INFRA BY SEPT '26
Primary Substation- Infra RM1
Foul Connection - Phases 1, 3, ED (East)
Foul Connection - Phases 2, 4, FD & S
Foul Connection - Phases FD (West)
Existing St Mellons Road
Cycle Way Link
PROPOSED LEVELS IN DEVELOPMENT TO BE RAISED TO ALLOW GRAVITY CONVEYANCE (MAU)
RETAIL PARCEL
TOTAL AREA: 1.72ha
IMPERMEABLE AREA: 1.4ha
Asphalt 80% (1No)
Roof 100% (1No) AREA 11.31.sq
EMPLOY. STORAGE REQUIRED= 1020M³
(CELLULAR OR MAIN SUBJECT TO DEVELOPMENT SLYOUT)
PROPOSED SWALE WITH BAFFLES TO PROVIDE ADDITIONAL STORAGE
PIPED SECTION OF DRAINAGE TO DRAIN INTO PROPOSED SWALE
PROPOSED PIPED SECTION OF DRAINAGE TO CONNECT/AVOID WITHIN ACTIVE TRAVEL ROUTE TO WHOLESOME DRAINAGE INFRASTRUCTURE
PROPOSED SECTION (TBC TO UNDER) RAIN GARDENS TO PROVIDE INTERCEPTION
PROPOSED SWALE WITH CHECK DRAM TO SERVE BOTH ACTIVE TRAVEL ROUTE AND DEVELOPMENT
STEPPED SWALE WITH BAFFLES TO PROVIDE 400M³ OF ADDITIONAL STORAGE
DISCHARGE TO BE SPLIT WITHIN RETAIL PARCEL LAYOUT BUT RESTRICTED TO QBAR THROUGH ONSITE CONTROLS. DETERMINATION OUTFALL OF DESIGNATED POND TO BE REPLACED WITH NEW CONTROL DEVICE TO ALLOW FOR THE ADDITIONAL FLOWS.
STEPPED SWALE WITH BAFFLES TO PROVIDE 400M³ OF ADDITIONAL STORAGE
PIPED SECTION OF DRAINAGE TO DRAIN INTO PROPOSED SWALE
Existing St Mellons Road
Cycle Way Link

Revision	Date	Amendment	Initials

thinkurban
Architecture & Civil Engineering
Quest House
51 Mellons Business Park
Fortran Road
Cardiff CF3 0EY

NORTH EAST CARDIFF
CARREG COETIR

Drawing title: WHOLE SITE DRAINAGE CATCHMENTS STRATEGY
Date: 08.12.24
Scale: 1:2500 @ A0
Drawn by: LF
Status:
Drawing Number: 211109-DS-SK001
Revision: E

DO NOT scale off this drawing. Check dimensions before use and notify Think Urban Design Ltd. of any discrepancies immediately. Contractors, subcontractors and suppliers must verify all dimensions supplied on this drawing and on site before commencing works. Check the contents of this drawing with all relevant consultants before ordering materials.
© Think Urban Design Ltd.

Taylor Wimpey plc
TAYLOR WIMPEY HOMES
Building 2, Eastern Business Park,
Wern Fawr Lane, St Mellons, Cardiff.

APPENDIX C
INSTALLATION EXAMPLES AND EXAMPLE MANUFACTURER PRODUCT SHEETS

APPENDIX C
INSTALLATION EXAMPLES

Retention of a wide vegetated buffer adjacent to a surface watercourse



Placement of stone to the front of plots to create clean forklift access



APPENDIX C
INSTALLATION EXAMPLES

Installation of silt fencing to control run-off from an unsurfaced area



Placement of silt matting to capture settled silt downgradient within a surface watercourse (image courtesy of Frog Environmental)



APPENDIX C
INSTALLATION EXAMPLES

Silt matting installed along the base of an unsurfaced swale to capture settled suspended solids prior to discharge into a surface watercourse





Dewatering bag used to treat water pumped from excavations. Dewatering bag is placed upon a pallet for ease of movement, onto clean gravel to dissipate the flow and prevent scouring, in a vegetated area for infiltration.



APPENDIX C
INSTALLATION EXAMPLES

Utilisation of flocculant treated silt matting (Floc Mat) to treat water pumped from excavations (image courtesy of Frog Environmental)



Silt Wattles utilised to separate clean and silty water within a watercourse (image courtesy of Frog Environmental)



APPENDIX C
INSTALLATION EXAMPLES

Silt Wattles utilised to intercept silt laden run-off on a road
(image courtesy of Frog Environmental)



Silt matting and Silt Wattles deployed within a surface watercourse. Silt Wattles create a check dam promoting settlement of suspended solids, which is captured by the silt matting.
(image courtesy of Frog Environmental)



APPENDIX C
INSTALLATION EXAMPLES

Coarse stone used to create periodic check dams (in conjunction with a geotextile) to reduce scouring within a swale until vegetation establishes.





Silt Wattles utilised to intercept silt laden run-off from an unsurfaced slope
(image courtesy of Frog Environmental)

APPENDIX C
INSTALLATION EXAMPLES



Silt fencing and straw bales installed across an inlet headwall within an attenuation basin, to promote settlement of silt within the concrete apron (where it can more easily be removed) prior to discharge into the attenuation basin. Coarse stone installed to dissipate flow and prevent scouring, and further promote settlement at the headwall.



APPENDIX C
INSTALLATION EXAMPLES

Silt fencing and straw bales installed across an outlet headwall within an attenuation basin, to promote settlement of silt within the basin prior to discharge into the surface watercourse



Silt fencing installed across an outfall headwall, to promote settlement of silt within the concrete apron prior to discharge into the surface watercourse (in the event of breach of other control measures)



APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Product:	Application	Manufacturer and product
Gulley Protection	Prevent silt and construction debris entering the drainage system and blocking gully pots. Proprietary products often yield superior results to straw and terram and require less maintenance.	Forest Group – Gully Guard Hy-Tex – Ultra drain guards
Silt Fencing	Attenuate water on site to promote settlement of silt within overland run-off.	Frog Environmental – Silt Fence Hy-Tex – Terrastop Silt Fence Siltbuster – Silt Fence
Silt Matting	Capture settled silt as it naturally falls from suspension within watercourses, swales, attenuation basins to prevent its resuspension.	Frog Environmental – Silt Mat Hy-Tex – SediMat
Flocculant Treated Silt Matting	Capture settled silt within watercourses, swales, attenuation basins to prevent its resuspension. The addition of flocculant treatment encourages silt to settle out of suspension more readily. The Environment Agency must be consulted prior to utilisation of flocculants, and an environmental permit gained where required.	Frog Environmental – Floc Mat
Silt Wattle	Used as check dams within watercourses / swales providing filtration and also slowing the flow of water to promote settlement of silt. Typically used in conjunction with silt matting (or flocculant coated silt matting) to capture sediment that was caused to settle. Can also be used to separate silty and clear water (i.e. within attenuation basins, or watercourses), on slopes to reduce erosion from overland run-off or to divert silty water to collection areas (i.e. on roads to divert silty run-off away from gullies).	Frog Environmental – Silt Wattle Hy-Tex – Ultra Erosion Guard (suitable for use as a check dam to control erosion only, due to its different construction to the Frog Environmental Silt Wattle).
Filter socks	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with smaller volumes and lower flow rates.	Hy-Tex – Pro-Tex Pipe Socks Murlac – Silt Sock Dirtbags UK – Utility Bag
Filter bags	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with larger volumes and larger flow rate, typically up to a 6” pump. Note – * denotes those bags which are sized to be used within a roll on roll off skip for ease of disposal of capture silt.	Hy-Tex – Ultra Dewatering Bag Siltbuster – Siltstoppa Dewatering Bag* Murlac – Silt Bag Dirtbags UK – Dirtbag / Titan Dirtbag*
Settlement Tanks	Settlement and capture of suspended solids during dewatering / over pumping works of a larger volume than suitable for a dewatering bag, or during extended periods of dewatering / over pumping. The unit required is dependent on the grain size of suspended particles, how quickly these settle from suspension, and the required flow rate. Liaison with the supplier is best undertaken to ensure a suitable product is selected. Can be used in conjunction with flocculants and coagulants to promote settlement, however the Environment Agency must be consulted prior to their utilisation, and an environmental permit gained where required.	Siltbuster – wide range of settlement units available Andrew Sykes Group – settlement tanks / Silt Away. Dirtbags UK – Dirtbox

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

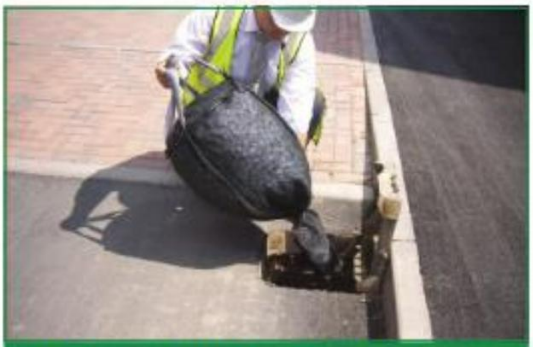
GULLEY PROTECTION

The Gully Guard

Installation guide



1. Lever open gully grid. Gully Guard is designed to fit all size gullies.



2. Hold handles at top of the Gully Guard, work beads to top and insert base into water filled gully pot.



3. Lower the Gully Guard into the pot. The beads will fall freely into the void within the pot.



4. Tuck the holding handles to the side of the Gully Guard.



5. Close gully grid.

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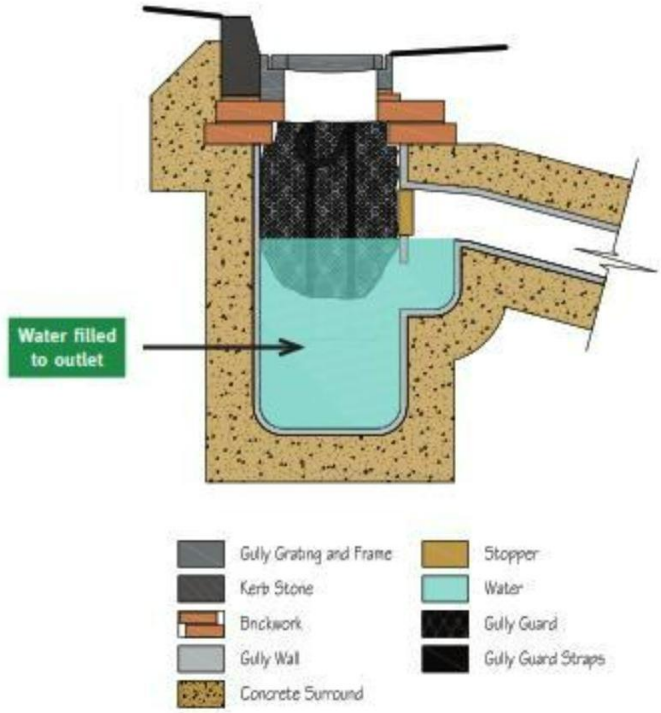
Patent no. 2472690

The Forest Group
High performance, versatile solutions

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

The Gully Guard

Installation diagram



Maintenance

The Company (Forest Drainage Products) would recommend that an inspection procedure be put in place for the product by the organisation on a 3–4 months basis depending on site conditions.

Maintenance would simply involve the removal of the Product and power hose off in a bund to contain and manage silt and any contaminants prior to reinsertion back into the gully pot.

Without prior knowledge of the type and concentration of the contaminants that each Gully Guard has been subjected to, the Company cannot advise on appropriate disposal. The Company advises that an environmental risk assessment is conducted on an individual case-by-case basis to fully evaluate the nature of contaminants. In order to determine the appropriate method of disposal the Company would recommend that you follow your organisation's environmental waste disposal policy.

Forest Drainage Products Limited (the "Company")

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APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Ultra Drain Guard** for Drainage Gully Sediment Control







Ultra Drain Guards are designed to remove oil and sediment pollution from surface water running into gully drains from surrounding construction sites, farms, industrial estates, or other areas prone to storm water pollution or cleaning operations.

Ultra Drain Guards are made from a high permeability non-woven polypropylene geotextile that trap solids and oils but allow water to drain through and also incorporate bypass ports to further maintain flow into the drain.

They are designed to be easily placed directly into the drain gully pot to filter out materials as they flow into the drain without compromising drainage, and the Oil and Sediment model absorbs up to 3.29 litres of hydrocarbons as well as up to 18 kg of sediment, sand or debris.

Installation:

1. Remove catch basin grating
2. Clean dirt and debris from grating ledge
3. Insert Drain Guard.
4. Reinstall grate. To insure maximum effectiveness, Drain Guard skirt should be secured (pinched) between grating and ledge.
5. Cut the excess fabric off with a blade or knife if desired.

Maintenance and disposal:

6. The Ultra-Drain Guard filters are designed to be used for 3 to 6 months under normal conditions.
7. Where heavy contamination is present the unit will have a reduced life expectancy. When the unit has collected about 6 inches of sediment it is recommended that it be replaced. The unit should also be replaced if free oil can be seen floating and is not being absorbed. The Ultra-Drain Guards should be inspected on a regular basis.
8. Dispose of unit in accordance with applicable environmental laws and regulations. The user is solely responsible for compliance with maintenance and disposal laws and regulations. The manufacturer or seller assumes no responsibility for proper or improper maintenance or disposal.

Model	Code	Oil Capture	Sediment Capture	Collection Area	Flow Rate	Size
Oil & Sediment	9217	3.29 l (.87 gal)	18 kg (40 lbs)	25.4 x 45.7cm (10" x 18")	1893 l/min (500 gpm)	121.9 x 91.4 x 45.7cm (48" x 36" x 18")





All of this was removed from 50 Ultra Drain Guards after just two weeks in storm drains

Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	979 N (220 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	423 N (95 lb)
Puncture Resistance	D 4833	600 N (135 lbs)
Mullen Burst	D 3786	2,896 kpa (420 psi)
Permittivity	D 4491	1.4 sec^{-1}
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m^2 (8 oz/yd^2)
Flow Rate - Fabric	D 4491	3,660 $l/min/m^2$ (90 $gal/min/ft^2$)
Flow Rate - Bypass Ports	D 4491	2,914 l/min

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APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT FENCING

frog environmental

product information sheet
Silt Fence
temporary silt control barrier



frog environmental supply Silt Fence and quarter cut 1.2 metre posts, ideal for providing support

Silt Fence is inexpensive to buy and install, but it must be correctly positioned and maintained for it to be an effective pollution control measure.

Each line of Silt Fence should be inspected on a regular basis, especially after rainfall.

If stakes are broken or gaps appear between the fence and the ground, then the fence should be re-trenched. Accumulated silt must be removed regularly from Silt Fence, typically when it reaches a third of the way up the fence.

Multiple smaller runs of silt fence are usually more effective at controlling pollution than longer lines.

Applications

- Silt Fence is deployed on construction sites to help prevent silt pollution in water bodies or from impacting public highways.
- Silt Fence provides a 'ponding' function; it allows silt laden water to collect behind it and for silt to drop out of suspension while the water slowly drains away or evaporates.
- Silt Fence is usually deployed in conjunction with other silt pollution control measures, especially on sites with clayey soils.

frog environmental Silt Fence is made from high specification geo-textile material and has medium porosity, making it suitable for use on most construction sites.

Poorly installed Silt Fence can cause erosion underneath or around the edges of fencing. This can lead to an increased silt pollution risk.

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)

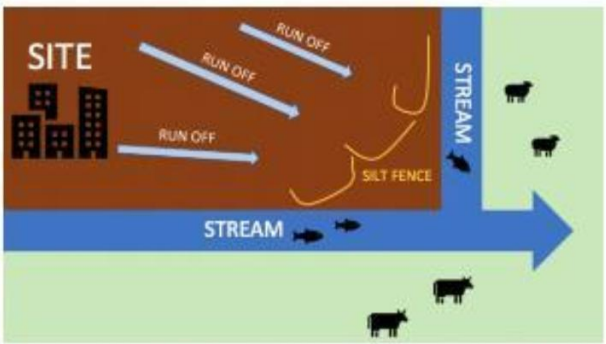
Dry Weight p/m: 110 g/m2 (9.9 kg single roll)

Permeability: 7 (l/m2 /sec)

Material used: tear resistant polypropylene geotextile, PFSC timber stakes (cable ties or staples/ nails to fix)

Function: creates a temporary fence to provide a pooling function that allows silt to drop from suspension

Disposal: all materials fully reusable or recyclable



Shorter J shaped runs of silt fence typically provide more effective pollution control than longer runs



Silt Fence can be used as a temporary measure to prevent muddy water escaping from construction sites

10 TIPS for successful Silt Fence deployments:

- Fence posts should be spaced a maximum of 1.5m apart
- Silt Fence should be trenched a minimum of 20cm into the ground and compacted
- Shorter 'J shaped' installations of Silt Fence act like mini-retention areas and are typically more effective than longer runs (as shown in the diagram above)
- Longer runs of silt fence will concentrate water in the lowest point, where the fence can become weakened and water can undercut or overflow the fence avoid these where possible
- Water flowing around the edges of silt fence can cause erosion and add to the pollution loading from site
- The lower part of the end of each run of silt fence should ideally be above the top of the middle section of the run
- Removal of accumulated silt and regular inspection are key maintenance activity for silt fence. A named individual should be responsible for this action on site
- Silt fences are not designed to handle continuous high volume flows and will not be an effective stand-alone control in these circumstances
- Factors such as soil type, slope angle and slope length are key factors in determining how much silt fence is needed on site
- If ground conditions are clayey Silt Fence alone is unlikely to be an effective pollution control

for technical support and sales of Silt Fence contact frog environmental
0345 057 4040
info@frogenvironmental.co.uk
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APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT MATTING

frog environmental

product information sheet
SiltMat
silt capture mat



SiltMat is a fully biodegradable mat that captures and prevents sediment resuspension.

The mats can be placed in natural or artificial channels, ditches or directly on land to trap suspended sediments.

SiltMat can be orientated sideways or lengthways and fits into all channel types.

SiltMats are used to manage sediment release to watercourses from construction sites and for capturing silts suspended by in channel or works on river banks.

Applications

- Silt control from construction sites
- Silt control from river or bank works
- Deployed in rivers, streams and ditches
- Deployed in Silt Capture Channels
- Used in forestry and agricultural applications

SiltMat is proven in the field to reduce downstream levels of suspended solids

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — SiltMat

Dimensions: 2 x 1 x 0.12 metres

Dry Weight: 12kg per mat

Material used: coir (80%) jute (20%)

Function: Captures and prevents resuspension of silt

Performance: Single mat captures up to 40kg of silt

Disposal: Fully biodegradable, with correct permissions used mats can be disposed ofland.





four step guide to using SiltMats

Use our reference table (below) to judge optimal placement. As a rule of thumb, SiltMat is best placed in areas where stream energy is reduced and natural deposition takes place.

SiltMat is unfolded and orientated to cover the width of the channel. The edges of silt mat can be overlaid without gaps. Mats are staked in place or weighted with local material.

SiltMat will trap large amounts of sediment. Stakes or weights are removed and the mats rolled up ready for disposal.

With correct permission SiltMat can be seeded and left on site, creating an environmental enhancement and avoiding disposal costs.

Reference table showing the distance that different particle sizes travel at differing water velocities

Particle Size	Water Speed (m/s)				
	0.2	0.4	0.6	0.8	1
Fine Gravel	20 cm	40 cm	60 cm	80 cm	1 m
Sand	70 cm	1.4 m	2.1 m	2.8 m	3.5 m
Fine Sand	8 m	17 m	25 m	33 m	40 m
Silt	228 m	456 m	683 m	911 m	1139 m

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APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FLOCCULANT TREATED SILT MATTING

frog environmental

product information sheet
Floc Mat™
water treatment mat



Floc Mat™ is a versatile silt control device

A mat created to treat and capture fine silts and suspended particles in construction site run off.

The main function of the mat is to flocculate very fine particles, making them easier to separate from water.

Floc Mats can be laid flat out in dispersion fields, used with Silt Wattles or silt fence and deployed in the frog environmental Silt Capture Channel as part of a versatile water treatment process to remove silt from construction site run off.

Applications

- In a Silt Capture Channel
- With Silt Wattles and SiltMats
- In site ditches and low flow channels
- In combination with silt fence
- On natural dispersion fields
- In combination with dewatering bags and silt socks

- **Floc Mat™ is a fully biodegradable water treatment and silt capture mat that treats muddy water and helps prevent silt pollution**
- **They are a cost effective way of treating water in ditches and channels, without the need for pumps – saving energy and CO_2**

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information — FlocMat™

Dimensions: 2x1 x 0.10m

Variants: FM1 (30g/m2), FM2 (100g/m2) FM0(untreated)

Active ingredient: Water Lynx™

Dry Weight: 12 kg per mat

Material used: coir fibres, coir netting, coir rope, anionic flocculant, water

Function: Water treatment – aids solid water separation. Can be used to segregate low flow channel to in bankside works.

Performance: Single mat captures up to 50kg of silt in live test

Disposal: Fully biodegradable, suitable for re-use on site (with correct permit).

Waste classification and disposal legislation must be followed at all times. Always liaise with the regulator before deploying a product containing flocculant. If in doubt contact frog environmental on 0345 0574040 for further information and advice.



Close up FlocMat showing accretion of silt



Deployed in Silt Capture Channels with Silt Wattles

100% sustainably sourced natural fibres are used to create Floc Mat, this ensures the mats are biodegradable and suitable for use as backfill material once used, reducing waste disposal costs. Floc Mat is available in treated and untreated forms.

The fibres of the treated version of Floc Mat are coated with Water Lynx™, a non-hazardous, non-toxic, synthetic anionic polymer which contains no coagulants, cations or metals such as Al and Fe that are ecotoxic.

When deployed in a Silt Capture Channel the Floc Mat provides a safe, low carbon and easy solution to support the removal of suspended solids and associated pollutants from construction site run off.



Deployed to treat muddy excavation water

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APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT WATTLE

frog environmental

product information sheet
Silt Wattle
silt control sausage



Silt Wattles are a versatile silt control device.

They are deployed on building sites to control movement of suspended silt and in ditches, channels and streams to slow the flow and naturally capture silt.

Silt Wattles are often deployed with frog environmental SiltMats and FlocMats as part of a silt pollution prevention strategy.

Applications

- Silt Wattles can be used to reduce silt release into watercourses from construction sites and deployed directly in channel to reduce movement of suspended silts.
- The tough exterior netting means they can be left for months on site with out degradation, whilst the biodegradable treated wood fibre continues to slow the flow and trap silt particles.
- Silt Wattles mould to the shape of the river bed or ground and can be joined end on end or pyramided to help clean dirty water.
- Wattles are highly versatile and can be weighted or staked in position depending on bed/ground conditions and flows.
- Silt Wattles can be joined end of end to create temp low flow channel and protect rivers from pollution arising from bank works.

Silt Wattles are a versatile product suitable for use in a wide range of silt control applications on construction sites and in river works

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

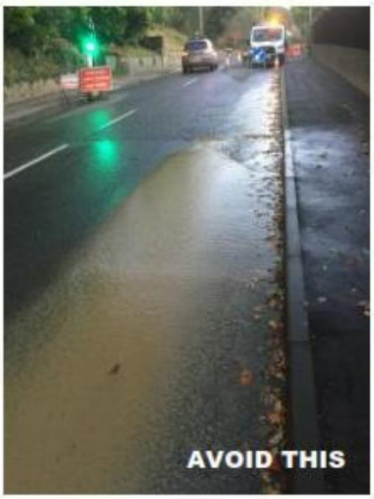
FILTER SOCKS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Pro-Tex Dewatering Socks** for Pumped Sediment Control

☑ **Ideal for small dewatering jobs.**

☑ **Traps sediment and oil.**







OIL DETECTION INDICATOR

A light blue paper oil detection strip is attached to each bag



If strip turns **DARK BLUE**
OIL PRESENT
Stop pumping
Contact your Environmental Manager

Pro-Tex Dewatering Socks control pollution caused when pumping dirty water from excavations, and offers an economical alternative to traditional dewatering bags or filtration products.

These easy to use and popular sediment filters bags are ideal for projects with small budgets and minor pollution problems to control of sediment and oil sheen from pumped water.

Designed to attach directly to the discharge pipe, they quickly filter water to help prevent unwanted sediment, silt, debris or pollutants leaving the site in run-off.

The socks have been designed to control pollution caused by pumping dirty water from excavations, trenches, lift shafts, bunds and the like, by filtering out sediment from contaminated water down to 90 micron, while the fabric the socks are constructed from has an inherent ability to absorbs hydrocarbons too.

Advantages

The main advantage of using an Oil & Sediment filter is that it removes hydrocarbons and sediment from pumping activities.

It provides an alternative solution that delivers a considerable cost saving and is user friendly. Furthermore it reduces site time over existing methods such as hiring a vacuum tanker. If you wish to carry out street works with a minimal disruption to the public, this is the ideal solution.

Other benefits include:

- Simple set-up with built in tie
- Hydrocarbon detection strip to identify oil pollution
- Lightweight and compact
- Very easy to empty



Product: Pro-Tex Dewatering Sediment Bag. Premium Pipe Sock.
Application: Oil and Sediment Filter
Effective Pore Size: 90 micron
Sediment Capacity: Approx 18kg
Permeability: 72 litres/m²/sec
Tensile Strength: 19 kN/m
CBR Puncture Strength: 2,900N
Material: UV stabilised. continuous filament, non-woven, needle punched polypropylene fabric.
Bag Size: Approx 1.00 x 0.30m lay flat
Additional Features: Tying cord and hydrocarbon detection strip

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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FILTER BAGS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Ultra Dewatering Bags** for Pumped Sediment Control







Hy-Tex Ultra Dewatering Bags provide an effective way to collect harmful sediments from dirty water pumped out of excavation works (such as foundations, pipe line construction, water, sewer and utility trenches, waterways and lakes) that would otherwise pollute the surrounding environment.

It is a legal requirement to prevent silty water from leaving site untreated, and a finable offence if you do not take appropriate pollution control measures. The Environment Agency Pollution Prevention Guidelines PPG6 (See side panel), in summary, require that the majority of suspended solids (gravel, sand, and silt) must be removed from site water before it is discharged into a drain, sewer or watercourse.

Traditionally settlement methods (such as straw bale structures or settlement ponds/tanks) are often ineffective, rely on slow water movement, long settlement times, expensive and time consuming tank maintenance and large works areas.

Ultra Dewatering Bags are an efficient, practical, quick, simple and cost effective alternative solution to manage this ongoing environmental problem of removing suspended solid pollutants from pumped water on construction sites.

Sediment-laden water is simply pumped into the high quality filter bags, which trap the solids inside and allow filtered water to flow freely out through the geotextile fabric to disperse into the surrounding ground or another collection point.

Ultra Dewatering Bags can also be used for gravity feed applications such as outfall pipes from site drainage or lagoons.

The silt filter bags provide a passive non-mechanical solution, without the use of excessive or specialist machinery (other than possible lifting equipment when full), and do not require a large work area.

The sediment bags are also light, compact and easy to store, with minimal cleaning up required - when full just dispose of the bag and replace with another bag.

The Ultra Dewatering Bags detain both oil and sediment, offering a combination of benefits not available in alternative products. They can also be used to contain contaminated sediment whilst treatments are applied (such as flocculants or absorbents).

The standard 1.80 x 1.80m Ultra Dewatering bags has the capacity to trap near 1 tonne of silt and cope with flow rates up to 2,730 l/min, while the larger 3.05 x 4.55m bags can trap over 4 tonnes of silt and cope with flow rates up to 6,818 l/min.

The Environment Agency

"Working at construction and demolition sites: PPG6 Pollution Prevention Guidelines"

"Poor management of silt and silty water is a major cause of serious pollution incidents from construction sites. Silt for these purposes is a fine inert sediment derived from soil and rocks.

Silt pollution can: damage and kill aquatic life by smothering and suffocating; reduce water quality; cause flooding by blocking culverts and channels…"

"You must not discharge any silty water to a drain or watercourse without prior treatment to settle or remove suspended solids. If you've identified that you will be generating silty water, identify suitable means to treat the water before discharge; examples include: lagoons, settlement tanks, silt traps grassy areas that slow water and allow solids to settle…"

"You must have prior permission from the local sewerage provider if you intend to discharge settled water to the foul sewer because this will be regarded as a trade effluent.

You must have prior permission from [the Environment Agency] if you need to discharge anything to a watercourse. In Scotland if you comply with certain conditions, a discharge will be covered by a General Binding Rule and you will not need to contact SEPA."

Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	912 N (205 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	378 N (85 lb)
Puncture Resistance	D 4833	578 N (130 lbs)
Mullen Burst	D 3786	2,758 kpa (400 psi)
Permittivity	D 4491	1.4 sec^{-1}
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m^2 (8 oz/yd^2)
Flow Rate	D 4491	3,660 $l/min/m^2$ (90 $gal/min/ft^2$)

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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Ultra Dewatering Bags** for Pumped Sediment Control





Usage Guidelines

Ideally position the Ultra Dewatering Bag on a slope, so incoming water flows downhill through the bag, and, as a precaution, install Terrastop Premium silt fence down slope of the bags to control any potential run-off pollution.

The bag is fitted with a collar which fits around delivery hoses or connectors. Strap the neck of the Ultra Dewatering Bag tightly to the discharge hose using the attached tying cord.

To increase filtration efficiency place the bag on an aggregate, or a layer of Hy-Pave tiles, to maximize water flow through the under surface of the bag.

Plan ahead for removal, if the filled bags are to be lifted for disposal then place suitable lifting straps under bag prior to pumping, alternatively you can roll the bags into a digger bucket.

Regularly check the bags. The Ultra Dewatering Bag is full when it no longer can efficiently filter sediment or pass water at a reasonable rate.

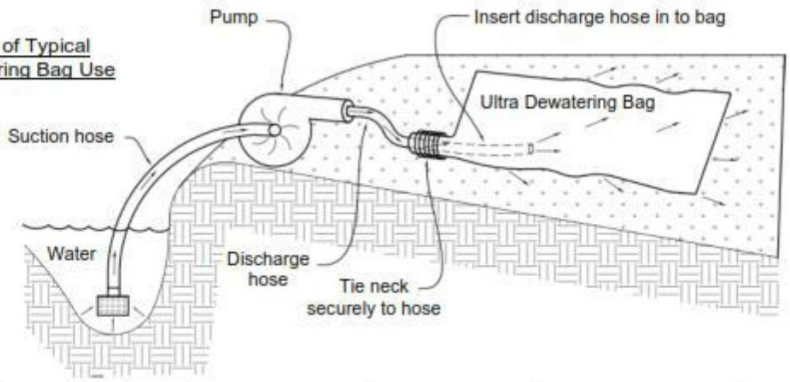
Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

Under most circumstances Ultra Dewatering Bags will accommodate flow rates of up to 2,730 l/min for the 1.80 x 1.80m bags and 6,816 l/min for the 3.05 x 4.55m bags.

Use of excessive flow rates, or overfilling Ultra Dewatering Bags with sediment, may cause ruptures of the bags or failure of the hose attachment straps.

Dispose of the Ultra Dewatering Bag as directed by the site engineer. Normally allow the bags to dry in place then either cut open, spread and landscape on site or remove and dispose of the filled bags (Heavy lifting machinery may be required).

Illustration of Typical Ultra Dewatering Bag Use



Size	Code	Surface Area	Max Flow Rate	Max Pump Size	Sediment Capacity	Oil Capacity
1.80 x 1.80 m (6 x 6 ft)	9724	6.68 m² (72 ft²)	2,730 l/min (500 gal/min)	10 cm (4 inch)	0.51 m³ / 980 kg (18 ft³ / 2,160 lbs)	14 l (3.7 gal)
3.05 x 4.55 m (10 x 15 ft)	9725	27.87 m² (300 ft²)	6,818 l/min (1,500 gal/min)	15 cm (6 inch)	4.20 m³ / 4,082 kg (150 ft³ / 9,000 lbs)	57 l (15.1 gal)

Notes:

Flow/Dewatering rates will vary according to soil type (Sand typically dewaters at the fastest rate, while clay dewaters at the slowest). Clay may also blind over the fabric in some instances, significantly reducing flow.

Max flow rate is a cautious figure based on a significantly de-rating of the clean fabric flow rate of approx 3,660 l/min/m² (90 gal/min/ft²) to allow for pump pressure build up due to silt accumulation.

Sediment capacity is calculated using wet sand weight of approx 1,920kg/m³ (120 lbs/ft³) and a bag fill height of approx 150mm

Oil capacity is estimated at low flow conditions with approx 2.09 l/m² (0.5 gal/yd²) absorption capacity

All data stated and the recommendations made herein are offered free of charge and are accurate to the best of our knowledge. Hy-Tex (UK) Ltd assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. Hy-Tex disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, material, or information furnished herewith. Final determination of the use of any information or material, or how it is useful, and whether the use infringes any patents is the sole responsibility of the user.

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Hy-Tex (UK) Limited
Committed to Quality, Value & Service

APPENDIX C
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Siltbuster®

Siltbuster Siltstoppa Bags

Siltstoppa Bags provide a low cost solution for the dewatering of sludges and slurry.

Pre-conditioned (flocculated) slurry is pumped into the Siltstoppa Bag and allowed to dewater. The water released from the sludge bleeds through the geotextile fabric whilst the trapped solids remain in the bag.

Siltstoppa De-watering Bags are available individually, to sit on a suitable slab or drainage area or can be supplied as a complete treatment solution including as required sludge conditioning unit, and roll-on/roll-off (RORO) container.

When the bag is full and the trapped solids have dewatered, the Siltstoppa bag can either be split open on-site and the dewatered solids removed by means of an excavator (or similar equipment), or the full RORO container can be transported for off-site disposal.

Siltbuster Siltstoppa Bags Specs

Separation Method	Geotextile Membrane
Height	Expands until full
Length	6.5m
Width	2.1m
Dry Weight	Size Dependant
Materials	Sludges and Slurries
Material Colour	Black
Bag Capacity	6m³
Operating Range	Material Dependant

Siltbuster Siltstoppa Skip

Siltstoppa De-Watering Bags have been conviently sized to fit an industry standard roll on roll off (RORO) Siltstoppa skip. The RORO dewatering skip provides a secure and environmentally acceptable means of bunding a Siltbuster Siltstoppa Dewatering Bag.

When the skip is full with either single or multiple bags (stacked up on top of each other), the skip and its contents can be transported to a Waste Management Facility for disposal of the dewatered sludge/slurry contained within the Siltstoppa Bags.

The Siltstoppa Skip comes complete with an integral sump, allowing easy removal of the water which escapes from the dewatering sludge/slurry.

Siltbuster Siltstoppa Skip Specs

Separation Method	Geotextile Membrane
Height	1.2m
Length	6.1m
Width	2.6m
Dry Weight	2.0 tonne
Material	Flocculated Particles
Operating Capacity	1 Bag
Lifting Method	RORO Hooklift
Operating Range	Material Dependant





SETTLEMENT TANKS

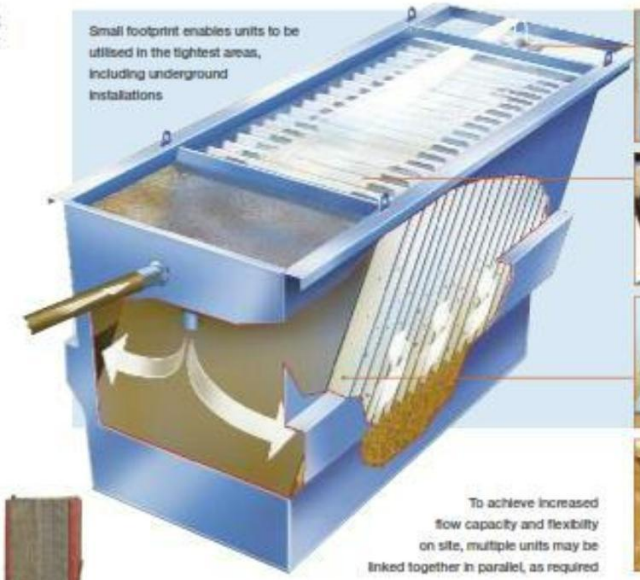
Siltbuster®

Gravity Settlement ▸ Siltbuster Settlement Units & Water Clarifiers

Siltbuster is the UK's leading provider of mobile settlement units and Lamella Clarifiers. Each unit in the extensive range is specifically designed to remove suspended solids and settleable matter from silt and solids laden surface run-off and groundwater.

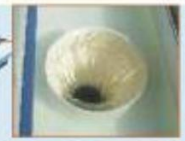
Effective gravity based solid/liquid separation requires the largest possible settlement area and optimum hydraulic flow. Siltbuster Clarifiers utilise lamella plate technology to maintain ideal settlement conditions within each unit, thereby, ensuring maximum particle settlement and minimum unit footprint.





Small footprint enables units to be utilised in the tightest areas, including underground installations

To achieve increased flow capacity and flexibility on site, multiple units may be linked together in parallel, as required



Innovative outlet design maintains flow even when the unit is not exactly level

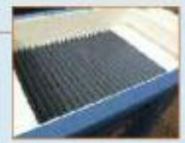
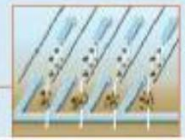


Plate technology and configuration hugely increases settlement area. Plates are designed for easy handling



Flow distribution has been designed to meet the rigours of the modern construction site



Emptying can be achieved by a range of methods, e.g. via drain ports & valves, vacuum tanker or by manual or mechanical means

Siltbuster mobile clarifiers are robust; skid-mounted; compact and lightweight, making them simple to transport, install and operate. They are ideal for sites with limited access, restricted spaces and temporary projects.
Hopper bottomed units can be fitted (on request) with an automatic sludge removal system making their operation virtually maintenance-free.

Typical applications

Construction

- Pumping & de-watering
- Groundwater treatment
- Site run-off treatment
- Drilling, piling & coffer dams
- In-river & near-river works
- De-silting & dredging
- Roads, pipelines & other linear projects
- Plant, vehicle & wheel washing
- Site water management

Silt Management

www.siltbuster.com

The Siltbuster Mobile Range

Siltbuster offers a range of various sized units to provide customers with flexibility and the opportunity to hire or purchase a tailored, yet off the shelf, solution.

The Mobile Range, Size Comparison













FB50	HB10	HB20	HB40R	HB50
Flat-bottomed, skid-mounted unit. The Construction Industry's favourite	Hopper-bottomed, skid-mounted unit	Enlarged version of HB10. Increased flow rate and sludge storage. Batch or continuous sludge draw-off	Hopper-bottomed, skid-mounted unit	Performance of the FB50 but with twin hoppers for larger capacity, primary thickening applications and batch or continuous sludge draw-off
Height: 1.9m	Height: 2.1m	Height: 2.6m	Height: 3.1m	Height: 3.1m
Length: 3.7m	Length: 1.9m	Length: 2.5m	Length: 3m	Length: 3.7m
Width: 1.45m	Width: 0.9m	Width: 1.2m	Width: 2.2m	Width: 1.7m
Effective Settlement Area: 50m²	Effective Settlement Area: 10m²	Effective Settlement Area: 20m²	Effective Settlement Area: 40m²	Effective Settlement Area: 50m²
Dry Weight: 1,960kg	Dry Weight: 510kg	Dry Weight: 1,120kg	Dry Weight: 2,480kg	Dry Weight: 2,370kg
Inlet: 4" bauer	Inlet: 2" bauer	Inlet: 3" bauer	Inlet: 4" bauer	Inlet: 4" bauer
Outlet: 6" bauer	Outlet: 3" bauer	Outlet: 4" bauer	Outlet: 6" bauer	Outlet: 6" bauer
Typical Operating Capacity: 1-50m³/hr	Typical Operating Capacity: 1-10m³/hr	Typical Operating Capacity: 1-20m³/hr	Typical Operating Capacity: 1-40m³/hr	Typical Operating Capacity: 1-50m³/hr

The benefits

- Readily transportable, fast and simple to setup, easy to operate.
- Small footprint units with large settlement area
- Unique design enables rapid particle settlement and water clarification
- Up to 20 times more efficient than conventional settlement tanks and lagoons of the same plan area
- Choice of unit sizes and capabilities to suit most applications
- Units can be used individually or linked to accommodate a wide range of flows, pump sizes and particle charcteristics



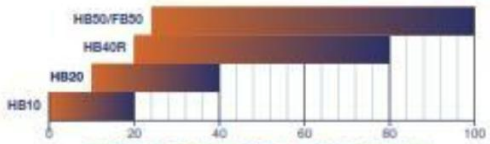
Options & Process Add-ons

Total Water Treatment Solutions

Siltbuster Clarifiers can be configured as single or mulitiple units for basic gravity separation and discharge-to-sewer applications. They can also be supplied as part of a complete, tailored, packaged treatment solution – including ancillary equipment, such as:

- Lids, covers, walkways & access platforms
- Flow splitter valves, flow meters & flanged ports
- Automatic, flow proportional, single or multi-stage chemical pre-treatment
- Fully containerised dosing systems
- Flash mixers
- Pipe flocculators or mixing/aging tanks
- Automatic desludging systems
- Sludge pumps & sludge storage tanks
- De-watering systems

Siltbuster Mobile Clarifier Operating Range



For hire, sales or more details call Siltbuster on 01600 772256

Process Add-ons

Chemical Dosing, Pre-treatment & Reaction Systems

Siltbuster believes that, wherever possible, the use of chemicals to treat excess site water should be avoided. However, there are some types of waste water, contaminants and effluent which still require the use of chemicals to increase the particle settlement rate, so as to enable their removal. This can be due to either the presence of very fine particles; clay; colloidal matter; colour or simply the soil's own interparticle electrical bonds which need to be interupted in order for settlement to occur.

In such cases, chemical dosing is unavoidable. Consequently, Siltbuster has developed an extensive range of chemical dosing systems to compliment it's award-winning settlement units.



Treatment Systems

Flocculant Blocks
Basically, a flocculant in a solid form. When immersed in water the solid dissolves, releasing the chemicals, causing a reaction.

Single-Stage & Multi-Stage Dosing Systems
Siltbuster's Single-Stage dosing systems range from a single dosing pump linked to a drum of coagulant or acid/alkali for pH adjustment, through to an IBC based flocculant batch makeup system and associated pumped dosing. The dosing rate is fully controllable and can be linked to flow rate and chemicals can be added to mixing/reaction tanks, in-line or via pipeflocculators. For more complex dosing regimes requiring similar levels of accuracy, Siltbuster offers Multi-stage dosing systems, including staged coagulant and flocculant dosing, often with an intermediate stage for pH adjustment.

Chemical Reaction Systems

The reaction rate of treatment chemicals, dictates the system required.

Mixing Tanks
Siltbuster can supply mixing tanks, ranging from 1m³ to 30m³ capacity.



Pipeflocculators
For faster reacting chemicals, various pipeflocculators are available.



Containerised Integrated Dosing Units

Siltbuster can provide secure, self-contained, in-line dosing units which enable the controlled, flow-proportional, multi-stage addition of treatment chemicals. For flows up to 150 m³/hr, the 'plug & play' systems come pre-installed in a 10ft (3m), 20ft (6m) or 40ft (12m) shipping container, as required.

Options include:

- Bunded chemical storage
- Flow-proportional dosing systems
- Reaction/aging tanks and pipeflocculators
- Control panels and datalogging
- Insulation, lighting and heating
- Integrated Lamella or DAF Units (subject to model and size).
- Automatic monitoring of feed and discharge water



Full Treatment Packages

Siltbuster's in-house laboratory can test a wide range of chemicals to identify the treatment regime most suited to your needs. A sample of the untreated water, your flowrate and the required discharge limits are all that is needed.

Silt Management

www.siltbuster.com

APPENDIX D
INSPECTION CHECKLIST EXAMPLES

GULLEY INSPECTION CHECKLIST
SITE:

Date	Gully no	Fit for purpose (yes/no)	(if no: action required, clean / replace?)	Comment	Signature

SITE INSPECTION CHECKLIST
SITE:

Name of person undertaking inspection: .....
Date: .....
Current weather conditions: .....

Description	Comments	Action	Initial
1) What is the current condition of the gully protection measures within the completed / un-adopted areas of the site? *Note any gullies requiring maintenance measures*			
2) What is the current condition of the gully protection measures within the active areas of the site? *Note any gullies requiring maintenance measures*			
3) Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate? *Consider whether additional visits should be scheduled.*			
4) Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage or stream? *Note if additional measures are required to reduce the run-off from these unsurfaced areas.*			

5) Are control measures in place to prevent silt run-off from unsurfaced areas and soil stockpiles? *Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures.*			
6) What is the current water condition of the water bodies / watercourses (including attenuation basins / swales)? *Note any discolouration of the water or obvious sign of sediment within the water.*			
7) Is there any dewatering of excavations taking place on site? *Note what activities are taking part and their location.* *Note any control measures in place.*			
Notes and actions to be taken:			

Completed by	Name	Signature	Date
Site Manager			

APPENDIX E
GEL FLOCCULANT DOSING TRIAL

Clear thinking
for cleaner water

Settlement test and flocculant validation report

RSK Geosciences
North East Cardiff TW
FC7328
2 February 2026

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info@frogenvironmental.co.uk
frogenvironmental.co.uk

Company number: 973815

Project disclaimer

The use of flocculants on site requires permission from the local regulatory authority. Proceeding with deployment of Gel Flocculant without regulatory permission is not advised.

Whilst Frog Environmental provide advice on product specification and deployment, we are not in control of the construction site or any portion of the construction site at any time. Frog Environmental does not take responsibility for the quality of water discharging from site at any time, and do not accept design liability for the efficacy of any water treatment systems that are developed as part of this report. Please refer to our full Terms & Conditions prior to procurement, as these will form part of any contract for supply of silt control products and services.

Any product specifications, technical drawings, sketches and site plans provided by Frog Environmental Ltd in relation to this report are proposals and should be reviewed and approved by the Permanent Works Designer.

Testing results are indicative and are reliant on the representative nature of samples. Most silt control systems require an element of fine tuning once installed to operate at optimal levels.

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frogenvironmental.co.uk

Frog Environmental Ltd.
The Stables, Blakenhall Park,
Bar Lane, Barton under Needwood,
Staffordshire, DE13 8AJ, UK

Purpose and scope

Testing has been undertaken on a soil & water sample from the above-mentioned site. The testing process examines the rate of natural separation of solid fraction from water and helps inform the type of silt pollution control measures that may be required during Temporary Works.

Frog Environmental has a protocol in place that we will first examine the possibilities for treating water without the deployment of flocculants. Only when this avenue has been exhausted through testing and site investigation will frog suggest the use of a flocculant. For more information about the use of flocculants on construction sites, please follow the link: https://www.frogenvironmental.co.uk/pollution-avoidance-and-mitigation/flocculant-use-on-a-construction-site/

If test results show that a flocculant is required, there is a preference for working with the customer to develop gravity fed treatment systems. Gravity fed systems have several distinct advantages over pumped system:

- Reduced energy and carbon footprint
- Reduced fuel costs
- Reduced pump hire costs
- Reduced risk associated with refueling

A limitation of gravity fed treatment systems can be the effective mixing of flocculant with effluent. In these circumstances, forced mixing using a pumped flow of water can improve reaction times and settlement rates. Gravity fed systems are therefore not appropriate for every site.

Technical summary

Natural settlement at North East Cardiff TW reduced turbidity from a Start (Control) value of 804 NTU to 734 NTU over a period of 10 mins. After 2 hours NTU, turbidity further decreased to 349 NTU, with slight visible change. A 24-hour settlement provided a reduction in turbidity to 66 NTU.

Testing showed the most effective Gel Flocculant to be a combination of 494+360. The flocculant validation test comprises of three stages:

- The first stage of testing reduced turbidity from 804 NTU to 641 NTU, resulting in a slow reaction with water remaining cloudy.
- A second stage lowered turbidity further to 576 NTU, with some minor signs of flocculation.
- The third stage didn't provide a significant reduction resulting in 370 NTU. Very small flocculated particles were formed and remained in suspension.
- A fourth stage was performed, achieving a turbidity of 297 NTU, with water retaining colouration and very few more particles deposited.

Contents

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2. Conclusions and next steps....7
3. Factors affecting the risk of silt pollution....7
4. About Gel Flocculant....8
5. Test process....8

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The Stables, Blakenhall Park,
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1. Results

Natural Settlement.

Water temperature (°C)	pH
6 °C	8.1



Control vs Settlement 2 hours

Turbidity
804 NTU to 349 NTU



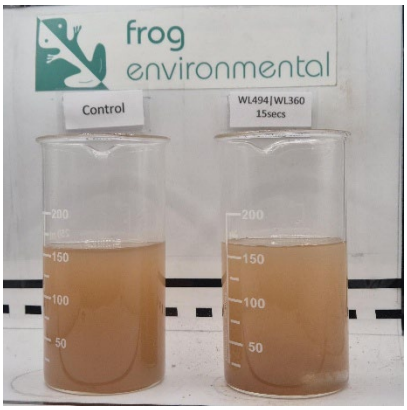
Control vs Settlement 24 hours

Turbidity
804 NTU to 66 NTU

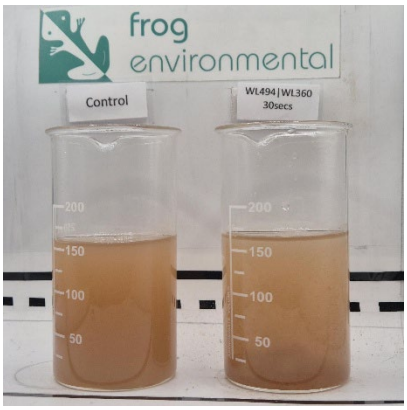
Natural settlement period	Turbidity
Control (start)	804 NTU
10 mins	734 NTU
30 mins	552 NTU
1 hour	392 NTU
2 hours	349 NTU
24 hours	66 NTU

Natural settlement at North East Cardiff TW reduced turbidity from a Start (Control) value of 804 NTU to 734 NTU over a period of 10 mins. After 2 hours NTU, turbidity further decreased to 349 NTU, with slight visible change. A 24-hour settlement provided a reduction in turbidity to 66 NTU.

Gel Flocculant Validation



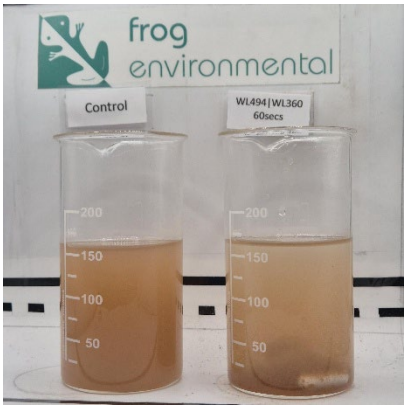
A. Test 1 Control vs Gel Flocculant 494+360 (15 seconds agitation plus 30 seconds settlement)



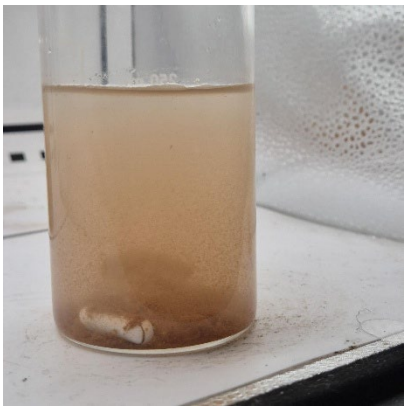
B. Test 2 Control vs Gel Flocculant 494+360 (further 15 second agitation from Test 1 plus 60 seconds settlement)

Turbidity
804 NTU to 641 NTU

Turbidity
641 NTU to 576 NTU



C. Test 3 Control vs Gel Flocculant 494+360 (further 15 second agitation from Test 2 plus 60 second settlement)



Turbidity
576 NTU to 370 NTU

Test 3 Close-up

Testing showed the most effective Gel Flocculant to be a combination of 494+360. The flocculant validation test comprises of three stages:

- The **first stage** of testing reduced turbidity from 804 NTU to 641 NTU, resulting in a slow reaction with water remaining cloudy.
- A **second stage** lowered turbidity further to 576 NTU, with some minor signs of flocculation.
- The **third stage** didn't provide a significant reduction resulting in 370 NTU. Very small flocculated particles were formed and remained in suspension.
- A **fourth stage** was performed, achieving a turbidity of 297 NTU, with water retaining colouration and very few more particles deposited.

2. Conclusions and next steps

Physical settlement didn't produce clear water at North East Cardiff TW under laboratory conditions. Achieving natural settlement on-site is unlikely unless large attenuation can be provided and external factors such as weather and flow are managed. Flocculant addition only improve treatment performance slightly, even after 4 dosing stages, with the sample remaining cloudy and unsuitable for discharge offsite.

3. Factors affecting the risk of silt pollution

Settlement Testing is a key factor when it comes to assessing the risk of a construction site causing a silt pollution event. However, there are other important factors to consider:

Factor	Why is it important?
Settlement characteristics of particle (defined by Settlement Test)	Defines how the silt particles behaves when in suspension with and without the application of Gel Flocculant
Water Attenuation areas and attenuation design	Attenuation areas slow the flow of water and allow time for silt or floc particles to settle out of suspension. If this can be done without use of flocculant, it should be.
Permitted Total Suspended Solids (TSS) value expressed in mg/l	Notes the quality of water acceptable for discharge.
The flow rate of effluent that requires treatment	Treatment solutions have differing effective treatment rates. Knowing the flow rate helps to come up with the most cost-effective approach.
Proximity and connectivity to watercourse(s)	Where does surface water from your site drain to? It is illegal to cause silt pollution or erosion at the point of discharge.
Knowledge and Experience on site	Skills and knowledge on site can help prevent a silt pollution incident or react quickly to mitigate one
Management Systems	Named roles and responsibilities on site helps a company to respond effectively to an incident.

There are 5 key components to a treatment system using Gel Flocculant:

- Mixing: the mixing of effluent with Gel Flocculant, through passive or forced measures.
- Capturing: trapping flocculated particles, either in attenuation features, Silt Capture Channels or a combination of measures.
- Maintenance: removing accreted silt from attenuation features or Silt Capture Channels
- Monitoring: testing effluent quality to ensure compliance
- Optimise: refine the system, scaling treatment up or down depending on the season or the risk associated with a specific construction phase

More information on the deployment of Gel Flocculant is available from Frog Environmental.

To discuss next steps, contact: natalia@frogenvironmental.co.uk.

4. About Gel Flocculant

Gel Flocculant is an active silt control product applied in slow-release solid gel blocks. It is designed to separate liquid from solid. Gel Flocculant is stored in dehydrated state and only activates in contact with water. There are several different blends of Gel Flocculant frequently used in the UK and settlement testing establishes the most effective blend for the site in question. In some circumstances a combination of 2 different blends of Gel Flocculant may provide the most effective solid separation.

Gel Flocculant products applied in the UK are synthetic anionic polyacrylamides that also have a coagulating function.

For peer reviewed information regarding the safety of Gel Flocculant and its fate in the environment, a literature review is available from Frog Environmental upon request.

Management calculations to demonstrate the carry-over concentrations of three key substances; Acrylamide, Polyacrylamide Polyelectrolyte (PP) and Aluminium contained in Gel Flocculant are completed for every project to ensure compliance with relevant Environmental Quality Standards (EQS) for drinking water. These calculations are intentionally conservative and do not account for the factor of dilution within the receiving waterbody nor any binding to the sediments. It is anticipated that any residual concentrations are present in very small concentrations.

Should there be specific environmental sensitivities, testing for acrylamide and aluminum concentrations in effluent can be undertaken as part of a management system to ensure thresholds are not breached. However, there are no UK laboratory tests available for polyelectrolytes.

5. Test process

The aim of testing is to record the natural separation of the solid fraction from water in controlled conditions. The control is tested against different Gel Flocculant blends with reaction times and type of floc produced noted. Where a control shows promise for effective natural settlement this will be recorded in the report and the customer advised of passive silt management interventions.

Once all Gel Flocculant blends have been tested, the most effective blend is photographed and included in the report, with the results of testing from other less effective blends omitted. The control is also photographed for comparison purposes.

Repeated agitation of the same sample gives a good indication for the reaction time required to settle solids from suspension. In each case an NTU reading is taken and shown in the key alongside a photographic record of the test. The level of agitation required for reaction helps to inform a deployment plan.

In some cases, Gel Flocculant will not be effective. Whilst cationic flocculants and liquid products are available, Frog Environmental do not supply these products for use in 'open' applications, such as surface water drainage from construction sites due to the associated environmental risks.

Where products tested by Frog Environmental are not effective, this will be openly discussed with the client and support provided in objectively reviewing alternative pollution control interventions.

Clear thinking
for cleaner water

Frog Environmental

Head to our **Knowledge Hub** for guidance, videos & events

frogenvironmental.co.uk/knowledge-hub/

Or visit our website to see our **free CPD & training** courses

Frogenvironmental.co.uk/training/

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APPENDIX F
MATERIAL SAFETY DATA SHEETS (MSDS)

SAFETY DATA SHEET

Gel Flocculant 360

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 360

CHEMICAL FAMILY: Polyacrylamide/polyacrylate polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire.

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO2, NOx)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Colour: Green to white or off-white

Odor: Slight vinegar odour.

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No Data Available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available.

pH: 7 (concentration dependent)

Viscosity: Not applicable.

Solubility (Water): Soluble in water but dissolves very slowly.

Partition Coeffecient (KOW): No Data Available.

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials.

10.2. Chemical Stability

This product is stable.

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur.

10.4. Conditions to Avoid

High temperatures.

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia.

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur.

Respiratory of skin sensitization: No known effects.

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: 140- 150 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: ≥ 125 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

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SAFETY DATA SHEET

Gel Flocculant 494

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 494

CHEMICAL FAMILY: Polyacrylamide polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: Yellow to white or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 5-7.5 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

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14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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APPENDIX C – ENVIRONMENTAL MANAGEMENT SYSTEM

Environment Policy

The Board of Taylor Wimpey plc will monitor the effectiveness of this Policy and will review the Policy on a regular basis and at least every two years.			
Approved by:	Board of Taylor Wimpey plc	Last Reviewed:	3 March 2026

Environment Policy

Taking action on the environment is essential to create great places to live for our customers, to reduce risks and costs to our business and to help protect the wellbeing of communities today and in the future. We are committed to continually reducing our footprint, building sustainable communities and creating a positive environmental legacy.

Our commitment covers all stages of development from land buying through to construction, and encompasses our operations, supply chain and customer homes and developments. We have a particular focus on three areas:

- Climate change
- Nature
- Resources and waste (including water use)

We aim to align with the UN Sustainable Development Goals and in particular to contribute to delivering UN Sustainable Development Goal 11: 'making cities and human settlements inclusive, safe, resilient and sustainable'. We are committed to reducing our environmental impacts and aim to work towards environmental net gain.

It is our policy to:

- Comply with all relevant environmental regulations and planning requirements
- Understand our environmental impacts and conduct regular materiality assessments
- Set quantitative targets through our environmental strategy to continually improve performance across our value chain
- Put systems in place to identify and manage environmental risks and opportunities and embed these into our wider risk identification and mitigation processes
- Implement our Health, Safety and Environmental Management System (EMS)
- Engage with suppliers, peers, environmental experts and others to reduce the environmental footprint of our business and the wider housebuilding sector
- Make it easier for customers to live a more sustainable lifestyle through the design and construction of our homes and developments and through our communications
- Ensure all business units comply with our Environment Policy
- Allocate resources and provide training to enable colleagues and site operatives to implement this policy
- Establish clear governance and review processes for environmental performance at business unit and Group level
- Publicly report performance against our environmental targets at least annually.

This policy should be read in conjunction with our Health, Safety and Environment Policy, Sustainability Policy and Supply Chain Policy.

Detailed policy commitments for Climate Change and Energy Use, Biodiversity and Nature, Sustainable Timber, Waste and Resources, and Water are provided in the following pages and collectively form our Environment Policy.

Climate Change and Energy Use

We will play our part in keeping global temperature rises to 1.5°C by reducing emissions across our value chain in line with climate science.

We have a significant carbon footprint through our operations, through the goods and services we buy and the energy used in our homes once customers move in. We also have an opportunity to help customers live a lower carbon lifestyle through the way we design our homes and developments.

We seek to align our approach with the Paris Climate Change Agreement and the UN Sustainable Development Goals 13 - Climate Action and 7 - Affordable and Clean Energy.

It is our policy to:

- Implement our net zero transition plan to reach net zero emissions by 2045
- Achieve our carbon reduction targets which have been verified by the Science Based Targets initiative and publicly report performance at least annually
- Purchase REGO backed green electricity for all new sites and transition existing contracts to REGO backed contracts
- Deliver energy efficient homes for customers and design our sites to enable sustainable transport and lower carbon lifestyles
- Engage with suppliers to achieve our scope 3 carbon targets, including selecting materials with lower embodied carbon and selecting energy efficient products
- Monitor and disclose our greenhouse gas emissions at least annually, in line with the Greenhouse Gas Protocol
- Identify and manage climate change adaptation and mitigation risks and opportunities for our operations, supply chain and customer homes, including conducting climate change due diligence on our sites prior to acquisition
- Engage with regulators, local planning authorities, peers, suppliers and others in the UK to speed up the decarbonisation of the housebuilding sector.

Taylor Wimpey Spain mainly buys serviced plots so does not control climate change and energy impacts relating to the development and infrastructure beyond the homes.

Biodiversity and Nature

Species, ecosystems and biodiversity are under threat across the world, due to changes in land use, pollution and climate change.

We recognise that our business depends on nature and the ecosystems services provided by the natural world. We aim to avoid and minimise the negative impacts of housing development on nature, and to use our sites to protect, enhance and increase biodiversity. This will also benefit the health and

wellbeing of our customers and communities.

We seek to align our approach with the UN Sustainable Development Goal 15, Life on Land.

It is our policy to:

- Identify and mitigate biodiversity impacts at all stages of development
- Comply with all relevant laws and planning requirements in relation to nature and biodiversity
- Conduct an ecological impact assessment for all sites and consult with ecologists to identify measures needed in relation to protected species and habitats. This includes where sites contain or are adjacent to protected areas (e.g. World Heritage sites or Sites of Special Scientific Interest). Measures must be integrated into the Site Specific Environmental Action Plan, part of our environmental management system
- Work with expert nature organisations and ecologists to develop and implement our biodiversity targets.
- Work with suppliers to address biodiversity impacts for our developments and in our supply chain
- Create opportunities for customers and communities to engage with nature on our sites
- Carry out risk assessments and additional due diligence for developments in areas of nutrient stress and work closely with the local authority to develop a proactive plan to address and mitigate the potential impacts of development.

This policy applies to our operations in the UK. Taylor Wimpey Spain mainly buys serviced plots and cannot control land outside the boundary of the homes. Taylor Wimpey Spain complies with all relevant laws and planning requirements in relation to nature and biodiversity.

Sustainable Timber

Forests are a vital natural habitat and home to 80% of the world's terrestrial biodiversity. They help to mitigate climate change, clean the air, prevent soil erosion and are a source of livelihoods for many millions of people. However, deforestation and illegal logging are affecting forests across the world.

We use significant amounts of timber to build and fit out our homes and operate our own timber frame factory. We are committed to responsible timber sourcing and to achieving a deforestation-free timber supply chain. As a landowner, we also have an opportunity to support efforts to increase tree planting by integrating trees into our development sites.

We aim to align our approach with the UN Sustainable Development Goal 15, Life on Land.

It is our policy to:

- Use timber and timber products from legally logged sources, in compliance with relevant regulations including the UK Timber Regulations and the EU Timber Regulations in Spain
- Not to use species included on the IUCN Red List of Threatened Species as vulnerable or endangered
- Require suppliers to supply timber and timber products from well managed forests with full chain

of custody certification from either the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC)

- Through our use of certified timber support the way of life, rights and livelihoods of indigenous communities that live and work in forests
- Reuse or recycle waste timber wherever possible during the manufacturing and construction process
- Integrate trees into our development sites, retaining existing mature trees wherever feasible
- Engage suppliers on our timber policy to aim to achieve a deforestation-free timber supply chain
- In the UK we require suppliers to disclose the timber species used, country of origin and volume for all timber and timber products supplied

Waste and Resources

Over consumption of resources and disposal of waste contributes to climate change, pollution and other environmental problems.

At Taylor Wimpey we use significant volumes of materials and natural resources to build our homes.

We aim to select sustainable materials, use resources efficiently, avoid and reduce waste, and increase reuse and recycling. This makes good business sense, reduces our environmental footprint and can help to improve resilience to future resource shortages and price rises.

We look for opportunities to adopt circular approaches to resource use and to work with others in our sector to bring about wider change. Our long-term goal is to achieve net zero avoidable waste from the construction of our homes.

We align our approach with UN Sustainable Development Goal 12 Responsible Production and Consumption.

It is our policy to:

- Apply the waste hierarchy to waste management in our operations, including avoiding waste through design, reusing and recycling as much as possible, and only disposing of waste to landfill as a last resort
- Set group waste reduction targets and report performance annually
- Ensure that all waste is handled and disposed of in an environmentally acceptable manner, in compliance with regulation
- Communicate our standards to suppliers and work with them to reduce waste, improve resource efficiency, increase recycling on our sites and increase our use of recycled, renewable and more sustainable materials
- Integrate resource efficiency into the design of our homes and developments
- Avoid and minimise any pollution from our development sites including in relation to remediated land, silt run-offs, spillages, dust and air quality.

- Develop a Site Waste Management Plan for all our construction sites.

In addition, in the UK it is our policy to:

- Maximise the reuse and recycling of soil and demolition waste from our sites, aiming to achieve zero mass balance for earthworks

- Ensure that any previously derelict or contaminated land is fully remediated so that it is safe and suitable for housing development

Taylor Wimpey Spain mainly buys serviced plots so does not control waste impacts relating to demolition and remediation, or excavation beyond the plot boundary.

Water

Human and environmental factors are putting pressure on global water resources. These include:

- Flooding due to the increase in intensity and frequency of storms, peak river levels and sea level rise caused by climate change;

- Increased demand for water supply due to population growth and urbanisation;

- Water scarcity and drought resulting from climate change and growing demand; and

- Damage to ecosystems from water over-abstraction and water pollution.

Our business is dependent upon water for the health and wellbeing of our employees, contractors and customers, and water is essential for the construction and use of our homes and developments. We recognise our business has both positive and negative impacts on the water environment. We strive to use water responsibly and to play our part in managing flood risk, reducing water use, minimising ecosystem impacts of abstraction, and protecting water quality for the benefit of our customers, communities, business and the environment.

We acknowledge the human right to water and sanitation and aim to support the UN Sustainable Development Goal 6 on clean water and sanitation.

It is our policy to:

- Help our customers reduce water consumption through measures such as low flow taps and showers, dual flush toilets, water meters in our homes; and to explore other ways to reduce home water consumption, and providing them with the information that they need.

- Work with suppliers to improve water efficiency and water quality in the supply chain.

- Use our environmental management systems and HSE processes to protect groundwater and surface water environments during construction.

- Set group targets for water use reduction from our operations and report performance annually.

Where we buy land in the UK, we are committed to:

- Assessing potential flood risk on proposed developments, (including from rivers, coast lines, groundwater, surface water and damaged drainage infrastructure) and ensuring that our developments are built to appropriate standards of flood resistance in line with the expected

impacts of climate change

- Working with local stakeholders to plan for water use in the areas we operate that experience water scarcity or drought.
- Working with local authorities to address challenges relating to water neutrality where needed
- Using surface water features to support placemaking, biodiversity and sustainable drainage, where this is appropriate.

Taylor Wimpey Spain mainly buys serviced plots. It complies with all laws in relation to flood risk and water management.

HEALTH, SAFETY AND ENVIRONMENTAL (HSE) POLICY

General Policy Statement

This HSE policy for Taylor Wimpey plc applies to all Taylor Wimpey UK companies, sites and businesses; Spain; and any other of its businesses and operations (collectively "Taylor Wimpey"). Taylor Wimpey plc regards HSE management as a non-negotiable number one priority for our business. We want all our employees and sub- contractors to leave each of our sites safe and well every day. Taylor Wimpey plc fully recognises the importance of maintaining good standards of HSE management and the impact this has on the effectiveness and sustainability of its business. In order to demonstrate our understanding and commitment, HSE Management Systems have been developed and are fully communicated throughout our organisation at all levels applying risk management and pollution prevention principles to our activities, products and services.

It is the policy of the Board of Taylor Wimpey plc ("Board") to ensure all activities meet or exceed all applicable HSE legislation, regulations and any other requirements to which we subscribe. In doing so all employees, contractors' employees, self-employed persons and the general public will be assured acceptable standards of HSE management.

The Board views HSE management as the top priority within the company and promotes HSE best practice being accepted as a core value in all businesses.

This Policy reflects the commitment of the Board and those accountable to the Board for its implementation. This Policy therefore outlines Taylor Wimpey's ongoing commitment to continuous improvement of our HSE performance. All businesses are required to conduct their business in a manner that, as far as is practicable, will minimise adverse effects upon the environment.

Taylor Wimpey will ensure the HSE policy is communicated, understood and implemented effectively at all levels throughout the business, including those persons working for or on behalf of the Taylor Wimpey and is formalised within the HSE management systems.

Organisation

- All levels of management across the Taylor Wimpey business are to be held responsible and accountable for operating a safe workplace that seeks to create a minimum burden upon the environment.

All employees are expected to strive to achieve and maintain the highest standards of HSE management and to comply fully with our HSE Management Systems.

Arrangements

- HSE considerations are agenda points at every meeting of the Group Management Team. A review of performance is carried out and measurable targets for HSE performance improvement are set and reviewed.

- Taylor Wimpey will maintain a review process that incorporates HSE performance targets, progress measurement, continual improvement and communication with relevant interested parties.

- The Board recognises that it can only achieve significant lasting improvement in HSE performance of its businesses if it has the co-operation and support of its contractors. Taylor Wimpey intends to continually encourage and promote the provision of suitable health, safety and environmental training to its contractors' employees and self-employed.

- Homes and Communities Agency, local planning authorities, NHBC, local and national government sustainability criteria, private and public landowners and other interested parties will be consulted over time to ensure our policies meet other non-statutory requirements and to ensure best practice.

- This policy and commitment of the organisation is only achievable by ensuring resources, be they human, technical or financial, are provided to those actively engaged in any of Taylor Wimpey's business activities. The Board is committed to provide those resources.

- The Board will regularly monitor and keep under review the effectiveness of this Policy.



Jennie Daly
Chief Executive
Taylor Wimpey plc
Date: 01.01.2026

APPENDIX D – TAYLOR WIMPEY - COMPANIES HOUSE OFFICER DETAILS

THIS POWER OF ATTORNEY is made by **Taylor Wimpey UK Limited (the "Company")** and dated 5 NOVEMBER 2025

1. **THE COMPANY HEREBY APPOINTS** the persons whose names and addresses are set out in the Schedule (the "Attorneys") jointly and severally to be the true and lawful attorneys of the Company in the name of and on behalf of the Company to do or consider, approve, issue, execute, sign, seal and deliver all agreements, contracts, notices, documents, applications, submissions, certificated and instruments (the "Documents") for or relating to any regulatory matters, licences, consents, applications or approvals by, from or relating to the Company including (but not limited) those to be made to the Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency, Natural England, Historic England, the Health and Safety Executive and any such successor or similar body or agency from time to time.
2. **THE COMPANIES HEREBY APPOINT** the persons whose names and addresses are set out in Schedule One Part One hereto (the First Attorneys) jointly and severally to be the true and lawful Attorneys of the Companies in the name of and on behalf of the Companies to do or execute sign seal and deliver all deeds transfers licences options instruments leases contracts discharges bonds missives dispositions receipts acknowledgements notices legal charges and agreements (the Documents) for or relating to the acquisition disposition or development of land and premises including the sale of individual plots upon the building estates of the Companies and the purchase and subsequent re-sale of any property acquired by the Companies by way of part exchange or otherwise.
3. **ANY** one of the Attorneys listed in the Schedule may execute all Documents in lieu of two directors or a director and the secretary of the Company, without prejudice to the Attorneys joint and several appointments.
4. **THE** Companies hereby agree to ratify all acts which the Attorneys shall lawfully do or cause to be done by virtue of this Power of Attorney.
5. **ALL** previous Powers of Attorney issued by the Company in this format and covers the same scope are revoked on the date first set out above
6. **THIS POWER OF ATTORNEY** shall remain in full force and effect for the period of one year from the date first set out above.

I certify this is a true and complete copy of the original.

Signed: [signature]

Print Full Name: KATHERINE HINDMARSH

Address: GATE HOUSE, TURNPIKE RD, HIGH WYCOMBE

Date: 5/11/25

SCHEDULE

David Blair Martin Findlay John Bain	} } }	all of Unit C, Ground Floor, Lightyear Building, Glasgow Airport Business Park, Marchburn Drive, Abbotsinch, Paisley, PA3 2SJ
Michael McMillan David Abercrombie Christopher Parkin	} } }	all of Rapier House, Colima Avenue, Sunderland, SR5 3XB
Noel Pettersson Nichola Burns Rob Allen	} } }	all of 1 Lumsdale Road, Stretford, Manchester, M32 0UT
Helen Nemeth David Stockton Robert Howell	} } }	all of 2 Trinity Court, Broadlands, Wolverhampton, WV10 6UH
Bryn Maidman Mark Chapman Andrew Wright	} } }	all of Castle House, Kempson Way, Suffolk Business Park, Bury St. Edmunds IP32 7AR
Mark Kennor Darren McArthur Jonathan Bowler	} } }	all of First Floor, Form 1, 17 Bartley Wood Business Park, Bartley Way, Hook, Hampshire, RG27 9XA
Keith Simmons Paul Greenland Lee Ritchie	} } }	all of Ground Floor, 730 Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UE
Tim Betts Iain Hamilton Sushil Expedith	} } }	all of Weald Court, 103 Tonbridge Road, Hildenborough, Tonbridge, Kent, TN11 9HL
Gavin Hamilton Pauline Mills James Denholm	} } }	all of 1 Masterton Park, South Castle Drive, Dunfermline, Fife, KY11 8PL

I certify this is a true and complete copy of the corresponding page of the original.

Signed:

Print Full Name: CATHERINE HANNAH

Address: GATEHOUSE, TURNPIKE RD, HIGH WYCOMBE

Date: 5/11/25

Michael Ford Paula McKeown James Denholm James Hamilton	} } } }	all of Taylor Wimpey House, Lockheed Court, Preston Farm Industrial Estate, Stockton on Tees, Cleveland, TS18 3SH
Lisa Waugh Simon Devine Trevor Oldfield	} } }	all of Washington House, Birchwood Business Park, Birchwood, Warrington, Cheshire, WA3 6GR
Tim Lightfoot Neil Mackay Jack McCallum	} } }	all of Second Floor, Fore 2, Fore Business Park Huskinson Way, Shirley, Solihull, B90 4SS
Iain Pay Eliot Holmes Conor Horton	} } }	all of Unit 2, The Osiers Business Park, Laversall Way Leicester, LE19 1DX
Sean Ridley Andrew Holloway Samantha Williams	} }]	all The Dock, Station Road, Kings Langley, Hertfordshire WD4 8LZ
Noel Staunton Ian McFaul Jon Bentley Katie Brandham	} } } }	all of Colvedene Court, Wessex Business Park, Colden Common, Winchester, Hampshire, SO21 1WP
Fikret Ulug Sam Harding Marco Guevara Steve Johnson	} } } }	all The Arch the Office Park Springfield Road Leatherhead KT22 7LP
Liz Reynolds Toni Taylor Jon Dobbs	} } }	all of Ground Floor, Eastern Business Park, Wern Fawr Lane, St Mellons, Cardiff, CF3 5EA
Hayden Dolby Richard Crick Jake Kirby	} } }	all of Newton House, 2 Sark Drive, Newton Leys, Bletchley, Milton Keynes, MK3 5SD

I certify this is a true and complete copy of the corresponding page of the original.

Signed:

Print Full Name: KATHERINE HINDMARSH

Address: GATE HOUSE, TURNPIKE RD HIGH WYCOMBE

Date: 5/11/25

Jo Ainsley Paul Arnold Ben Mansell	} } }	all of Sandpiper House, Peel Avenue, Calder Park, Wakefield, West Yorkshire WF2 7UA
James Lidgate Jason Emile Martin Eaton	} } }	all of Ground Floor East Wing, BT Brentwood, 1 London Road, Brentwood, Essex CM14 4QP
Rob Baker Sarah Williams Thomas Murrant	} } }	all of 4 Capital Court, Bittern Road, Sowton Industrial Estate, Exeter, Devon, EX2 7FN
Mark Nichols Jason Bennett Oury Bah	} } }	all of Unit 2, Tournament Court, Edgehill Drive, Warwick, Warwickshire, CV34 6LG

Executed as a **Deed** by
Taylor Wimpey UK Limited
acting by a director and secretary:

..... Director

..... ~~Secretary~~ DIRECTOR

I certify this is a true and complete copy o
the corresponding page of the original.

Signed:

Print Full Name: KATHERINE HINDMARSH

Address: GATE HOUSE, TURNPIKE RD, HIGH WYCOMBE

Date: 5/11/25

APPENDIX E – SETTLEMENT TEST AND SCREENING RESULTS

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 26/04291
Issue Number: 1 S1 **Date:** 30 April, 2026

Client:
RSK Environment Ltd Bristol
The Old School
Stillhouse Lane
Bedminster
Bristol
UK
BS3 4EB

Project Manager: *USE GeoGIdata@rsk.co.uk/Andrew Przewieslik
Project Name: North-East Cardiff TW
Project Ref: 315844-Phase 2
Order No: N/A
Date Samples Received: 10/04/26
Date Instructions Received: 10/04/26
Date Analysis Completed: 24/04/26

Approved by:



Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
pH (w)$_{A}^{\#}$	8.12	8.15	8.14					pH	0.01	A-T-031w
Dissolved Oxygen$_{A}$	9.7	9.7	9.7					mg/l	0.5	A-T-048
COD (settled)$_{A}^{\#}$	14	11	11					mg/l	5	A-T-034w
BOD (settled, 5 day)$_{A}$	<1	<1	1					mg/l	1	A-T-048
Total Suspended Solids (w)$_{A}^{\#}$	<10	34	<10					mg/l	10	A-T-036w
Sulphate (w)$_{A}^{\#}$	9	9	9					mg/l	1	A-T-026w
DOC - Dissolved Organic Carbon (w)$_{A}^{\#}$	<2.0	<2.0	<2.0					mg/l	2	A-T-032w
Arsenic (dissolved)$_{A}^{\#}$	<1	<1	<1					µg/l	1	A-T-025w
Cadmium (dissolved)$_{A}^{\#}$	<0.2	<0.2	<0.2					µg/l	0.2	A-T-025w
Calcium (dissolved)$_{A}^{\#}$	66.5	65.2	69.1					mg/l	1	A-T-049w
Copper (dissolved)$_{A}^{\#}$	<4	<4	<4					µg/l	4	A-T-025w
Chromium (dissolved)$_{A}^{\#}$	11	1	7					µg/l	1	A-T-025w
Lead (dissolved)$_{A}^{\#}$	0.2	0.5	0.3					µg/l	0.1	A-T-025w
Mercury (dissolved)$_{A}^{\#}$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-025w
Nickel (dissolved)$_{A}^{\#}$	<2	<2	<2					µg/l	2	A-T-025w
Selenium (dissolved)$_{A}^{\#}$	<1	<1	<1					µg/l	1	A-T-025w
Zinc (dissolved)$_{A}^{\#}$	2	2	<2					µg/l	2	A-T-025w

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
PAH 16MS (w)										
Acenaphthene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Acenaphthylene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Anthracene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Benzo(a)anthracene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Benzo(a)pyrene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Benzo(ghi)perylene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Chrysene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Fluoranthene (w)$_A^{\#}$	<0.01^U	<0.01^U	<0.01^U					µg/l	0.01	A-T-019w
Fluorene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Naphthalene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Phenanthrene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Pyrene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Total PAH 16MS (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
TPH CWG (w) with Clean Up										
Ali >C5-C6 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Ali >C6-C8 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Ali >C8-C10 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Ali >C10-C12 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Ali >C12-C16 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Ali >C16-C21 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Ali >C21-C35 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Total Aliphatics (w)$_A^{\#}$	<5	<5	<5					µg/l	5	Calc-As Recd
Aro >C5-C7 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Aro >C7-C8 (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
Aro >C8-C10 (w)$_A$	<5	<5	<5					µg/l	5	A-T-055w
Aro >C10-C12 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Aro >C12-C16 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Aro >C16-C21 (w)$_A^{\#}$	<5	<5	<5					µg/l	5	A-T-055w
Aro >C21-C35 (w)$_A^{\#}$	<10	<10	<10					µg/l	10	A-T-055w
Total Aromatics (w)$_A^{\#}$	<10	<10	<10					µg/l	10	Calc-As Recd
TPH (Ali & Aro >C5-C35) (w)$_A$	<10	<10	<10					µg/l	10	Calc-As Recd
BTEX - Benzene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
BTEX - Toluene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
BTEX - Ethyl Benzene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
BTEX - m & p Xylene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
BTEX - o Xylene (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w
MTBE (w)$_A^{\#}$	<1	<1	<1					µg/l	1	A-T-022w

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
Subscript "@"	Result is an opinion
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Bristol, The Old School, Stillhouse Lane, Bedminster, Bristol, UK, BS3 4EB

Project: North-East Cardiff TW

Clients Project No: 315844-Phase 2

Project No: 26/04291

Date Received: 10/04/2026 (am)

Cool Box Temperatures (°C): 10.9 & 11.4

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3
Client Sample No	1	1	1
Client Sample ID/Depth	Downstream	Upstream	Outfall
Date Sampled	08/04/26	08/04/26	08/04/26
A-T-019w	20/04/2026	20/04/2026	20/04/2026
A-T-022w	17/04/2026	17/04/2026	17/04/2026
A-T-025w	20/04/2026	20/04/2026	20/04/2026
A-T-026w	20/04/2026	20/04/2026	20/04/2026
A-T-031w	13/04/2026	13/04/2026	13/04/2026
A-T-032w	24/04/2026	24/04/2026	24/04/2026
A-T-034w	14/04/2026	14/04/2026	14/04/2026
A-T-036w	14/04/2026	14/04/2026	14/04/2026
A-T-048	15/04/2026	15/04/2026	15/04/2026
A-T-049w	20/04/2026	20/04/2026	20/04/2026
A-T-055w	22/04/2026	22/04/2026	22/04/2026
A-T-056w	17/04/2026	17/04/2026	17/04/2026
Calc-As Recd	22/04/2026	22/04/2026	22/04/2026

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 26/04291
Issue Number: 1 S2 **Date:** 30 April, 2026

Client:
RSK Environment Ltd Bristol
The Old School
Stillhouse Lane
Bedminster
Bristol
UK
BS3 4EB

Project Manager: *USE GeoGIdata@rsk.co.uk/Andrew Przewieslik
Project Name: North-East Cardiff TW
Project Ref: 315844-Phase 2
Order No: N/A
Date Samples Received: 10/04/26
Date Instructions Received: 10/04/26
Date Analysis Completed: 24/04/26

Approved by:



Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
OCP+OPP Combined Pest Suite (incl. Atrazine+Simazine) (w)										
Dichlobenil (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Tecnazene (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Trifluralin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
alpha-Hexachlorocyclohexane (HCH) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Hexachlorobenzene (HCB) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Simazine (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Atrazine (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
beta-Hexachlorocyclohexane (HCH) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Quintozene (PCNB) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Triallate (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
delta-Hexachlorocyclohexane (HCH) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Chlorothalonil (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Heptachlor (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Aldrin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Triadimefon (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Telodrin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Isodrin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Pendimethalin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Heptachlor epoxide (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
trans-Chlordane (Gamma) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
o,p-DDE (2,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endosulphan I (Alpha) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
cis-Chlordane (Alpha) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
p,p-DDE (4,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Dieldrin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
o,p-DDD (2,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endrin (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endosulphan II (Beta) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
p,p-DDD (4,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
o,p-DDT (2,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endrin Aldehyde (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endosulphan Sulphate (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
p,p-DDT (4,4) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
o,p-Methoxychlor (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Endrin Ketone (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
p,p-Methoxychlor (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Permethrin I (cis) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Permethrin II (trans) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Dichlorvos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Mevinphos (w)$_A$	<0.5	<0.5	<0.5					µg/l	0.5	A-T-056w
Demeton-S (w)$_A$	<0.5	<0.5	<0.5					µg/l	0.5	A-T-056w
Phorate (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Dimethoate (w)$_A$	<0.5	<0.5	<0.5					µg/l	0.5	A-T-056w
Demeton-O (w)$_A$	<0.5	<0.5	<0.5					µg/l	0.5	A-T-056w
Propetamphos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Diazinon (Dimpylate) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Disulfoton (w)$_A$	<0.5	<0.5	<0.5					µg/l	0.5	A-T-056w
Chlorpyrifos-methyl (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Methyl Parathion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Pirimiphos-methyl (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Fenitrothion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Malathion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Chlorpyrifos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Fenthion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Parathion (Ethyl Parathion) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Trichloronate (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Chlorfenvinphos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Fensulphothion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Prothiofos (Tokuthion) (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Ethion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Triazophos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Carbophenothion (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Phosalone (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Azinphos-methyl (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Azinphos-ethyl (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w
Coumaphos (w)$_A$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w

Envirolab Job Number: 26/04291

Client Project Name: North-East Cardiff TW

Client Project Ref: 315844-Phase 2

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3					Units	Limit of Detection	Method ref
Client Sample No	1	1	1							
Client Sample ID	Downstream	Upstream	Outfall							
Depth to Top										
Depth To Bottom										
Date Sampled	08-Apr-26	08-Apr-26	08-Apr-26							
Sample Type	WATER - SW	WATER - SW	WATER - SW							
Sample Matrix Code	N/A	N/A	N/A							
gamma-Hexachlorocyclohexane (HCH / Lindane) (w)$_{A}$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-056w

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
Subscript "@"	Result is an opinion
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Bristol, The Old School, Stillhouse Lane, Bedminster, Bristol, UK, BS3 4EB

Project: North-East Cardiff TW

Clients Project No: 315844-Phase 2

Project No: 26/04291

Date Received: 10/04/2026 (am)

Cool Box Temperatures (°C): 10.9 & 11.4

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	26/04291/1	26/04291/2	26/04291/3
Client Sample No	1	1	1
Client Sample ID/Depth	Downstream	Upstream	Outfall
Date Sampled	08/04/26	08/04/26	08/04/26
A-T-019w	20/04/2026	20/04/2026	20/04/2026
A-T-022w	17/04/2026	17/04/2026	17/04/2026
A-T-025w	20/04/2026	20/04/2026	20/04/2026
A-T-026w	20/04/2026	20/04/2026	20/04/2026
A-T-031w	13/04/2026	13/04/2026	13/04/2026
A-T-032w	24/04/2026	24/04/2026	24/04/2026
A-T-034w	14/04/2026	14/04/2026	14/04/2026
A-T-036w	14/04/2026	14/04/2026	14/04/2026
A-T-048	15/04/2026	15/04/2026	15/04/2026
A-T-049w	20/04/2026	20/04/2026	20/04/2026
A-T-055w	22/04/2026	22/04/2026	22/04/2026
A-T-056w	17/04/2026	17/04/2026	17/04/2026
Calc-As Recd	22/04/2026	22/04/2026	22/04/2026

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Clear thinking
for cleaner water

Settlement test and flocculant validation report

RSK Geosciences
North East Cardiff TW
FC7328
2 February 2026

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frogenvironmental.co.uk

Company number: 973815

Project disclaimer

The use of flocculants on site requires permission from the local regulatory authority. Proceeding with deployment of Gel Flocculant without regulatory permission is not advised.

Whilst Frog Environmental provide advice on product specification and deployment, we are not in control of the construction site or any portion of the construction site at any time. Frog Environmental does not take responsibility for the quality of water discharging from site at any time, and do not accept design liability for the efficacy of any water treatment systems that are developed as part of this report. Please refer to our full Terms & Conditions prior to procurement, as these will form part of any contract for supply of silt control products and services.

Any product specifications, technical drawings, sketches and site plans provided by Frog Environmental Ltd in relation to this report are proposals and should be reviewed and approved by the Permanent Works Designer.

Testing results are indicative and are reliant on the representative nature of samples. Most silt control systems require an element of fine tuning once installed to operate at optimal levels.

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Frog Environmental Ltd.
The Stables, Blakenhall Park,
Bar Lane, Barton under Needwood,
Staffordshire, DE13 8AJ, UK

Purpose and scope

Testing has been undertaken on a soil & water sample from the above-mentioned site. The testing process examines the rate of natural separation of solid fraction from water and helps inform the type of silt pollution control measures that may be required during Temporary Works.

Frog Environmental has a protocol in place that we will first examine the possibilities for treating water without the deployment of flocculants. Only when this avenue has been exhausted through testing and site investigation will frog suggest the use of a flocculant. For more information about the use of flocculants on construction sites, please follow the link: https://www.frogenvironmental.co.uk/pollution-avoidance-and-mitigation/flocculant-use-on-a-construction-site/

If test results show that a flocculant is required, there is a preference for working with the customer to develop gravity fed treatment systems. Gravity fed systems have several distinct advantages over pumped system:

- Reduced energy and carbon footprint
- Reduced fuel costs
- Reduced pump hire costs
- Reduced risk associated with refueling

A limitation of gravity fed treatment systems can be the effective mixing of flocculant with effluent. In these circumstances, forced mixing using a pumped flow of water can improve reaction times and settlement rates. Gravity fed systems are therefore not appropriate for every site.

Technical summary

Natural settlement at North East Cardiff TW reduced turbidity from a Start (Control) value of 804 NTU to 734 NTU over a period of 10 mins. After 2 hours NTU, turbidity further decreased to 349 NTU, with slight visible change. A 24-hour settlement provided a reduction in turbidity to 66 NTU.

Testing showed the most effective Gel Flocculant to be a combination of 494+360. The flocculant validation test comprises of three stages:

- The first stage of testing reduced turbidity from 804 NTU to 641 NTU, resulting in a slow reaction with water remaining cloudy.
- A second stage lowered turbidity further to 576 NTU, with some minor signs of flocculation.
- The third stage didn't provide a significant reduction resulting in 370 NTU. Very small flocculated particles were formed and remained in suspension.
- A fourth stage was performed, achieving a turbidity of 297 NTU, with water retaining colouration and very few more particles deposited.

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Technical summary....3
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2. Conclusions and next steps....7
3. Factors affecting the risk of silt pollution....7
4. About Gel Flocculant....8
5. Test process....8

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The Stables, Blakenhall Park,
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Staffordshire, DE13 8AJ, UK

1. Results

Natural Settlement.

Water temperature (°C)	pH
6 °C	8.1



Control vs Settlement 2 hours

Turbidity
804 NTU to 349 NTU



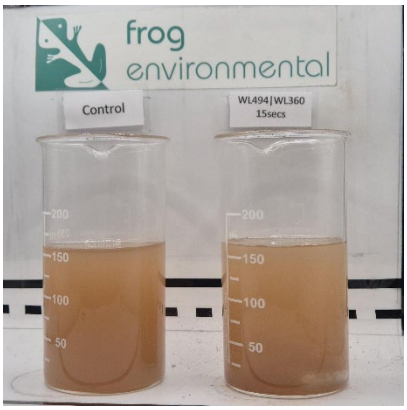
Control vs Settlement 24 hours

Turbidity
804 NTU to 66 NTU

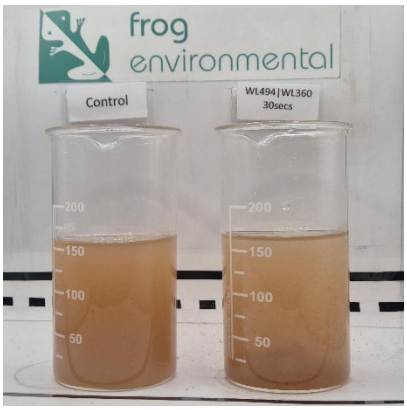
Natural settlement period	Turbidity
Control (start)	804 NTU
10 mins	734 NTU
30 mins	552 NTU
1 hour	392 NTU
2 hours	349 NTU
24 hours	66 NTU

Natural settlement at North East Cardiff TW reduced turbidity from a Start (Control) value of 804 NTU to 734 NTU over a period of 10 mins. After 2 hours NTU, turbidity further decreased to 349 NTU, with slight visible change. A 24-hour settlement provided a reduction in turbidity to 66 NTU.

Gel Flocculant Validation



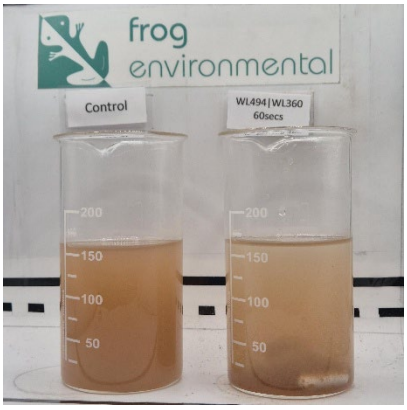
A. Test 1 Control vs Gel Flocculant 494+360 (15 seconds agitation plus 30 seconds settlement)



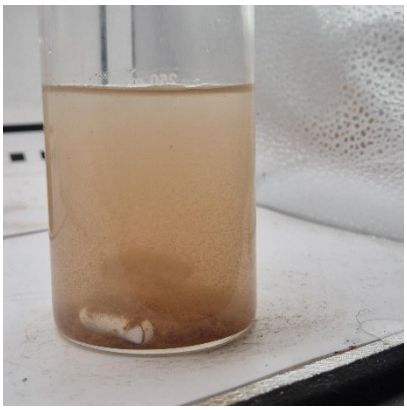
B. Test 2 Control vs Gel Flocculant 494+360 (further 15 second agitation from Test 1 plus 60 seconds settlement)

Turbidity
804 NTU to 641 NTU

Turbidity
641 NTU to 576 NTU



C. Test 3 Control vs Gel Flocculant 494+360 (further 15 second agitation from Test 2 plus 60 second settlement)



Turbidity
576 NTU to 370 NTU

Test 3 Close-up

Testing showed the most effective Gel Flocculant to be a combination of 494+360. The flocculant validation test comprises of three stages:

- The **first stage** of testing reduced turbidity from 804 NTU to 641 NTU, resulting in a slow reaction with water remaining cloudy.
- A **second stage** lowered turbidity further to 576 NTU, with some minor signs of flocculation.
- The **third stage** didn't provide a significant reduction resulting in 370 NTU. Very small flocculated particles were formed and remained in suspension.
- A **fourth stage** was performed, achieving a turbidity of 297 NTU, with water retaining colouration and very few more particles deposited.

2. Conclusions and next steps

Physical settlement didn't produce clear water at North East Cardiff TW under laboratory conditions. Achieving natural settlement on-site is unlikely unless large attenuation can be provided and external factors such as weather and flow are managed. Flocculant addition only improve treatment performance slightly, even after 4 dosing stages, with the sample remaining cloudy and unsuitable for discharge offsite.

3. Factors affecting the risk of silt pollution

Settlement Testing is a key factor when it comes to assessing the risk of a construction site causing a silt pollution event. However, there are other important factors to consider:

Factor	Why is it important?
Settlement characteristics of particle (defined by Settlement Test)	Defines how the silt particles behaves when in suspension with and without the application of Gel Flocculant
Water Attenuation areas and attenuation design	Attenuation areas slow the flow of water and allow time for silt or floc particles to settle out of suspension. If this can be done without use of flocculant, it should be.
Permitted Total Suspended Solids (TSS) value expressed in mg/l	Notes the quality of water acceptable for discharge.
The flow rate of effluent that requires treatment	Treatment solutions have differing effective treatment rates. Knowing the flow rate helps to come up with the most cost-effective approach.
Proximity and connectivity to watercourse(s)	Where does surface water from your site drain to? It is illegal to cause silt pollution or erosion at the point of discharge.
Knowledge and Experience on site	Skills and knowledge on site can help prevent a silt pollution incident or react quickly to mitigate one
Management Systems	Named roles and responsibilities on site helps a company to respond effectively to an incident.

There are 5 key components to a treatment system using Gel Flocculant:

- Mixing: the mixing of effluent with Gel Flocculant, through passive or forced measures.
- Capturing: trapping flocculated particles, either in attenuation features, Silt Capture Channels or a combination of measures.
- Maintenance: removing accreted silt from attenuation features or Silt Capture Channels
- Monitoring: testing effluent quality to ensure compliance
- Optimise: refine the system, scaling treatment up or down depending on the season or the risk associated with a specific construction phase

More information on the deployment of Gel Flocculant is available from Frog Environmental.

To discuss next steps, contact: natalia@frogenvironmental.co.uk.

4. About Gel Flocculant

Gel Flocculant is an active silt control product applied in slow-release solid gel blocks. It is designed to separate liquid from solid. Gel Flocculant is stored in dehydrated state and only activates in contact with water. There are several different blends of Gel Flocculant frequently used in the UK and settlement testing establishes the most effective blend for the site in question. In some circumstances a combination of 2 different blends of Gel Flocculant may provide the most effective solid separation.

Gel Flocculant products applied in the UK are synthetic anionic polyacrylamides that also have a coagulating function.

For peer reviewed information regarding the safety of Gel Flocculant and its fate in the environment, a literature review is available from Frog Environmental upon request.

Management calculations to demonstrate the carry-over concentrations of three key substances; Acrylamide, Polyacrylamide Polyelectrolyte (PP) and Aluminium contained in Gel Flocculant are completed for every project to ensure compliance with relevant Environmental Quality Standards (EQS) for drinking water. These calculations are intentionally conservative and do not account for the factor of dilution within the receiving waterbody nor any binding to the sediments. It is anticipated that any residual concentrations are present in very small concentrations.

Should there be specific environmental sensitivities, testing for acrylamide and aluminum concentrations in effluent can be undertaken as part of a management system to ensure thresholds are not breached. However, there are no UK laboratory tests available for polyelectrolytes.

5. Test process

The aim of testing is to record the natural separation of the solid fraction from water in controlled conditions. The control is tested against different Gel Flocculant blends with reaction times and type of floc produced noted. Where a control shows promise for effective natural settlement this will be recorded in the report and the customer advised of passive silt management interventions.

Once all Gel Flocculant blends have been tested, the most effective blend is photographed and included in the report, with the results of testing from other less effective blends omitted. The control is also photographed for comparison purposes.

Repeated agitation of the same sample gives a good indication for the reaction time required to settle solids from suspension. In each case an NTU reading is taken and shown in the key alongside a photographic record of the test. The level of agitation required for reaction helps to inform a deployment plan.

In some cases, Gel Flocculant will not be effective. Whilst cationic flocculants and liquid products are available, Frog Environmental do not supply these products for use in 'open' applications, such as surface water drainage from construction sites due to the associated environmental risks.

Where products tested by Frog Environmental are not effective, this will be openly discussed with the client and support provided in objectively reviewing alternative pollution control interventions.

Clear thinking
for cleaner water

Frog Environmental

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Frog Environmental Ltd.
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APPENDIX F – MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEET

Gel Flocculant 360

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 360

CHEMICAL FAMILY: Polyacrylamide/polyacrylate polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire.

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO2, NOx)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Colour: Green to white or off-white

Odor: Slight vinegar odour.

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No Data Available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available.

pH: 7 (concentration dependent)

Viscosity: Not applicable.

Solubility (Water): Soluble in water but dissolves very slowly.

Partition Coeffecient (KOW): No Data Available.

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials.

10.2. Chemical Stability

This product is stable.

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur.

10.4. Conditions to Avoid

High temperatures.

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia.

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur.

Respiratory of skin sensitization: No known effects.

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: 140- 150 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: ≥ 125 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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Information contained in this publication, while accurate to the best knowledge and belief of Frog Environmental Ltd (FEL) is not intended and should not be construed as a warranty or representation for which FEL assumes any legal responsibility.

Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

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SAFETY DATA SHEET

Gel Flocculant 494

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 494

CHEMICAL FAMILY: Polyacrylamide polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: Yellow to white or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 5-7.5 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

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